Comparative Analysis of Biological Detection and T Test for Body Shape of Students in Different Climate Environments

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Abstract: China is a multi-ethnic country, and the healthy growth of students of all nationalities is of great significance to improving the overall quality of the Chinese nation. Different peoples have different living and eating habits, so their health status and body shapes are very different. In order to explore the differences in body shape among adolescents under different altitudes, different climates, different diets and living habits, this paper analyzes the body shape of Xinjiang Uygur and Hainan Li students through survey interviews, literature review, statistical analysis and other methods. This study has identified the main factors affecting the differences in the physical form of the students of the two groups, and on this basis, has targeted the effective implementation of secondary school's physical education programs; the enhancement of health education and the improvement of students' nutrition methods.

1. Introduction

China has a vast territory, and the natural environment of different ethnic groups is, consequently, very different. Moreover, different ethnic groups have very diverse ethnic customs, and living and eating habits which, in turn, inevitably affects the physical health of young people of all ethnic groups and becomes reflected in terms of their body shape. Through statistical analysis and comparative study on the height, weight, chest circumference and other relevant data of Xinjiang Uygur and Hainan Li students of 13-to-17 years of age, this study unveils existing problems and provides an array of targeted solutions[1]. Adequate physical education methods and the adoption of appropriate effective interventions will ultimately achieve the goal of promoting the healthy growth of the majority of young children in China.

2. Research Objects and Methods

2.1. Research objects

The information on the height, weight and chest circumference of 13-to-17-year-old of age Xinjiang Uygur and Hainan Li students which was gathered in the 2010 Chinese Student Physical Fitness and Health Survey.

2.2. Research methods

2.2.1. Literature research method

In order to better complement the empirical research data available this subject, a large amount of literature related to this research was consulted through the Xinjiang Normal University Library, the Beijing Sport University Library, the Hainan Normal University Library, and the China Knowledge Network[2].

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2.2.2. Interview method

Interviews and exchanges were conducted with first-line physical education teachers, school sports supervisors, relevant leaders of education departments, students and parents in both Xinjiang and Hainan Provinces.

2.2.3. Statistical analysis

The data is analyzed and processed by the international social science statistical software package SPSS12.0 and Excel2003.

3. Multi-Factor Statistics and Comparison

3.1. Comparison of Body Shapes between Xinjiang Uygur and Hainan Li Students

3.1.1. The Comparative Study of the Height of Xinjiang Uygur and Hainan Li Students

Table 1 Comparison of heights (unit: cm) of Xinjiang Uygur and Hainan Li students 13-17 years old.

	Male					female				
	Uygur		Li			Uygur		Li		
age	average	Standard deviation	average	Standard deviation	P	average	Standard deviation	average	Standard deviation	P
13	154.82	10.02	155.88	8.79	P<0.05	150	5.87	156.66	6.63	p<0.01
14	159.83	8.08	162.19	6.76	p<0.01	154.79	5.1	154.31	4.27	P>0.05
15	164.97	6.9	165.47	5.75	P<0.05	156.38	5.16	156.18	5.55	P>0.05
16	166.07	6.83	166.62	6.71	P>0.05	157.48	4.9	156.79	5.39	P>0.05
17	167.95	5.46	167.08	5.71	P>0.05	158.24	5.66	157.85	5.02	P<0.05

(Note: P>0.05 means no difference, P<0.05 means difference, p<0.01 means significant difference)

The height comparison between Xinjiang Uygur students and Hainan Li students (13-to-17 years old) is shown in Table 1. Compared with the height of male students of Li ethnicity in the same age group, the average height of the 13-year-old Xinjiang Uygur boys is very similar[3]. At the age of 13, 14, 15, and 16, the Li boys are in an advantage; at the age of 17, Uighur boys are in an advantage, but they did not show the difference via statistics analysis (P>0.05. On the other hand, the height of the 13-year-old Uygur girls is significantly different from that of the Li girls in the same age group. At the age of 13, the average height of Uygur girls is 6.66 cm lower than that of Li girls; at the age of 14, the average height ratio of Uighur girls is 154.79 cm and therefore 0.48 cm higher than Li girls at 154.31; at the age of 15, the average height of Uighur girls is 0.2 cm higher than that of Li girls while the difference increases for the age range of 16 and 17 years old.

3.1.2. The Comparative Study of Body Weight between Xinjiang Uygur and Hainan Li Students

Table 2 Comparison of body weight (unit: kg) of Xinjiang Uygur and Hainan Li students at 13-17 years old.

	Male					female				
	Uygur		Li			Uygur		Li		
age	average	Standard deviation	average	Standard deviation	P	average	Standard deviation	average	Standard deviation	P
13	42.44	7.73	41.64	8.58	P>0.05	39.64	6.28	40.60	4.3	P<0.05
14	46.64	6.75	47.70	7.49	P>0.05	44.23	6.42	42.70	3.98	P<0.05
15	51.22	6.65	49.09	7.67	P>0.05	47.05	5.71	44.79	6.61	p<0.01
16	53.07	7.64	49.91	7.3	p<0.01	49.68	7.22	44.73	5.67	p<0.01
17	55.91	6.36	51.88	7.49	p<0.01	51.33	7.02	46.63	4.91	p<0.01

(Note: P>0.05 means no difference, P<0.05 means difference, p<0.01 means significant difference)

From the comparison of the weight of Xinjiang Uygur students and Hainan Li students (13-to-17 years old), we found out that the growth spurt of Xinjiang Uygur male students' weight takes place at 14-15 years old with an annual growth rate of 4.58kg. in average. By contrast, Hainan Li male students' weight shows a sudden increase at the age of 13-14. This takes place earlier than in the case of the Uygur male students but, except for the 14-year-old range, Uygur male students are larger than the Hainan Li students of the same age. On the other hand, the weight of Xinjiang Uygur girls in the age of 13-17 is lower than that of Hainan Li girls in the same age group. The average weight of Li students is significantly lower than that of Uygur girls of the same age. Thus, Xinjiang Uygur girls rank higher in weight than Li-age girls of the same age[4].

Table 3 Comparison of chest circumference (unit: cm) of Xinjiang Uygur and Hainan Li students 13-17 years old.

	male					female				
	Uygur		Li			**Uygur**		Li		
age	average	Standard deviation	average	Standard deviation	P	average	Standard deviation	average	Standard deviation	P
13	73.8	6	70.83	7.15	p<0.01	71.68	4.95	70.33	3.74	P<0.05
14	76.61	5.12	74.33	5.79	p<0.01	75.22	4.69	73.04	3.72	p<0.01
15	79.81	4.56	77.09	5.07	p<0.01	77.76	4.8	75.36	5.29	p<0.01
16	81.27	4.98	77.58	4.79	p<0.01	78.69	4.63	74.19	5.01	p<0.01
17	82.9	3.91	80.29	4.67	p<0.01	80.31	5.1	78.21	4.45	p<0.01

(Note: P>0.05 means no difference, P<0.05 means difference, p<0.01 means significant difference)

3.1.3. Comparative Study on Chest Circumferences of Xinjiang Uygur and Hainan Li Students

From the comparison of the chest circumferences of Xinjiang Uygur students and Hainan Li students (13-17 years old), Xinjiang Uygur male students have a breast circumference spurt period at 14-15 years old and an increase of 3.20 cm within one year. Hainan Li male students maintained a rapid growth in chest circumference at the age of 13-17, with an average annual increase of 3.15cm, which is larger than that of Xinjiang Uygur male students and lasts for a longer time. By comparing statistical analysis of the data of the two groups it is found that the 13-year-old Xinjiang Uygur boys' chest circumference is greater than the Li males of the same age group.

At the age of 13-14, the bust bulging period of Xinjiang Uygur girls increased by 3.54cm. However, the height of bust of Hainan Li girls was the fastest when they were 16-17 years old, with an increase of 4.02cm. Comparing the data between the two, it becomes apparent that the average bust of Xinjiang Uygur girls is larger than the average bust of Hainan Li girls in the same age group.

4. Suggestions

4.1. Strengthening sports research and improving teaching methods

The schools in the Li nationality area of Hainan should attach great importance to the research and reform of the physical education and health curriculum, and continuously improve sports and the methods and means of teaching health courses, vigorously developing the resources of physical education curriculum, improving the enthusiasm of students to participate in sports activities, make them develop a good life and physical exercise habits, form a lifelong physical exercise awareness, and effectively improve the physical health of Hainan Li students.

4.2. Increase nutrition, strengthen health education, and improve nutritional structure

It is necessary to strengthen nutrition and health education and guidance for schools and families in the region, and guide students and parents to make scientific meals and form good living habits[5]. Although the Xinjiang Uygur students have a good nutritional diet, they should also be

guided in order to enhance their physical exercise while fostering scientifically-sound eating and balanced nutrition, appropriately reducing fat intake and maintaining good body shape.

4.3. Studying the present state of affairs and promoting health education

It is necessary to further study the physical health of Li students and conduct targeted health education programs for Hainan Li students. The investment and support for health education provide conditions for the majority of students to exercise regularly in a scientific manner. Measures that need to be implemented include increasing the investment in school sports facilities and equipment, and formulating appropriate exercise prescriptions for students.

5. Conclusion

Through the research analysis of the body shape of students from 13-17 years old of two different nationalities, it is found that the body shape growth and development of students of the 13-17 age group of both nationalities is within the normal range. However, in the case of the Xinjiang Uygur students aged 13-17, the three indicators of height, weight and chest circumference are higher than those of Hainan Li students of the same age group. Different customs and habits, as well as eating habits and body shape development levels are directly related to this difference between the two groups. Hainan Li students live in mountainous areas or rural areas. The dietary habits of young students, the structure of nutritious meals and physical exercise measures need to be further improved. This is also the reason why Hainan students' physical form is at a disadvantage. Comprehensively improve the physical fitness of Hainan Li students will contribute to achieve the ultimate purpose of promoting the healthy growth of the majority of young children in China.

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