

A Study on Middle School Students' Physical Fitness Present Situation and Significant Difference in Urumqi

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Abstract: This research chose three schools in Urumqi, which respectively on behalf of exemplary senior middle school of Xinjiang Uyghur autonomous region, general middle school and rural middle school. The eighth grade students were selected as research object. Using the test method and ANOVA analysis method, two comparisons of SPSS 19.0, the research analyzed the physical fitness items on the basis of genuine data. Through comparative significant difference, the research tries to find out the facts that affect physical fitness. The results indicated the physical fitness of rural middle school is better than that of common middle school and key middle school. This shows that students' physical fitness is related to learning pressure on students and the time spent on physical activity.

1. Introduction

In recent years, the People's Republic of China pays more attention to teenagers' physical fitness and the test of physical fitness annually. From the view of teenagers' physical fitness situation in Xinjiang province, many scholars analyzed physical fitness according to the ethnic and mainly used the descriptive method, which provided reference for the following research, but they are lack of detailed comparative analysis based on the characteristics of teenagers in different schools.

The data of the three middle schools in Urumqi are true, which were collected on the spot, the record being handwritten by teachers. Three middle schools were chosen to represent three levels: the advanced middle school, the common middle school and the rural middle schools. The research attempted to solve three problems: 1. What are the real physical fitness situations of three middle schools? 2. Are there any significant differences in the physical fitness of the students among the three schools? 3. Whether the significant differences were related to the types of school? Can we find out the factors affecting physical fitness from the causes of differences?

2. Research Object and Method

2.1 Research Object. The eighth grade students of the three middle schools were chosen as the research object. The data were collected from the testing in 2015.

Affiliated Middle School of Xinjiang Normal University was built in 1984, which was rated demonstration advanced middle school in 2006. The Seventh School in Urumqi was established in 1962, which had over fifty years history. Dabancheng Middle School was a rural school.

2.2 Research Methods

2.2.1 Test Method. According to the test items in 《National Student Physical Health Standard》, boys in the eighth grade take part in the test of 50 meters, standing long jump, 1000 meters, pull up and sitting body flexion, girls in eighth grade take part in test of 50 meters, standing long jump, 800 meters, sit-ups per minute and sitting body flexion.

2.2.2 Mathematical Statistics. The research used Spss 19.0 to analyze the testing data from the three middle schools. The ANOVA analysis was used to test whether there are any significant differences in the physical fitness of the students among the three schools. The Post Hoc Test was used to compare the differences between the two groups.

3. Research Result and Analysis

3.1 Analysis on the Basic Situation of Boys' Physical Fitness in Three Schools

Table 1 Boys' Physical Fitness in Three Middle Schools in 2015

Year	Item	School	Sample	Average	Standard Deviation	Excellent Rate	Good Rate	Pass Rate
2015	standing long jump (cm)	Affiliated	100	201	32	13%	42%	89%
		Seventh	105	201	22	15.2%	40%	93.3%
		Dabancheng	89	192	24	3.7%	8.6%	65.4%
	sitting body flexion (cm)	Affiliated	100	6	6	5%	25%	89%
		Seventh	105	7	6	8.6%	40%	88.6%
		Dabancheng	89	7	4	2.4%	6.1%	95.1%
	50 meters (s)	Affiliated	100	8.5	1.1	15%	33%	88%
		Seventh	105	8.2	1.1	33.3%	41%	96.2%
		Dabancheng	89	7.9	0.8	35.8%	45.6%	96.3%
	Pull up (Number)	Affiliated	100	5	5	10%	13%	44%
		Seventh	105	4	4	6.7%	14.3%	33.3%
		Dabancheng	89	8	4	18.5%	32%	81.5%
	1000 meters (s)	Affiliated	100	300.2	51	6%	16%	69%
		Seventh	105	279.1	39	18.1%	33.3%	77.1%
		Dabancheng	89	279.7	30	11.1%	12.4%	69.1%

From table 1, we can see the results of boys' physical fitness in grade eight in three middle schools in 2015, among which the results of pull up were poor, the results of 1000 meters were relatively poor, while the results of sitting body flexion, standing long jump were basically qualified while the results of 50 meters were better.

The average of boys' pull up in Affiliated Middle School of Xinjiang Normal University was 5 ± 5 , the pass rate was 44%; the pull up average of boys in the Seventh School in Urumqi was 4 ± 4 , the pass rate was 33.3%; the average of boys' pull up in the Dabancheng Middle School was 8 ± 4 , the pass rate was 81.5%, from which we found that boys in the three schools had poor upper and lower waist strength.

The average of boys' 1000 meters in Affiliated Middle School of Xinjiang Normal University was $5' \pm 51''$, the excellent rate was 6%, the good rate was 16%, the pass rate was 69%; the average of boys' 1000 meters in the Seventh School in Urumqi was $4'39'' \pm 39''$, the pass rate was 77.1%; the 1000 meters average of boys in the Dabancheng Middle School was $4'49'' \pm 30''$, from which we found that boys in the three schools had poor endurance.

Both the standing long jump and sitting body flexion average were good, which indicated that the lower limbs strength and flexibility of boys in three schools had basically met the requirements of the National Student Physical Health Standard.

3.2 Analysis on the Basic Situation of Girls' Physical Fitness in Three Schools

Table 2 Girls' Physical Fitness in Three Middle Schools in 2015

Year	Item	School	Sample	Average	Standard Deviation	Excellent Rate	Good Rate	Pass Rate
2015	standing long jump (cm)	Affiliated	93	168	19	16.1%	34.4%	90.3%
		Seventh	99	168	15	9.1%	36.4%	93.9%
		Dabancheng	81	162	13	1.9%	15.4%	88.5%
	Sitting body flexion (cm)	Affiliated	93	10.1	6	15.1%	21.5%	82.8%
		Seventh	99	13.3	6	14.1%	41.4%	94.9%
		Dabancheng	81	9.3	5	3.8%	5.7%	88.5%
	50 meters (s)	Affiliated	93	9.3	0.7	8.6%	24.7%	97.8%
		Seventh	99	9.3	0.8	5.1%	26.3%	93.9%
		Dabancheng	81	8.8	0.7	13.4%	44.2%	96.1%
	sits-up (Number)	Affiliated	93	31	7	3.2%	9.7%	94.6%
		Seventh	99	36	6	6.1%	22.2%	99%
		Dabancheng	81	30	4	0%	0%	94.1%
	800 meters (s)	Affiliated	93	259.6	38	12.9%	23.7%	86%
		Seventh	99	253.4	26	9.1%	33.3%	90.9%
		Dabancheng	81	240.8	19	46.1%	55.7%	96.1%

From table 2, we can see the results of girls' physical fitness in grade eight in three middle schools in 2015. The average of girls' 800 meters in Affiliated Middle School of Xinjiang Normal University was $4'20'' \pm 38''$, the pass rate was 86%; the average of girls' 800 meters in the Seventh School in Urumqi was $4'14'' \pm 26''$, the pass rate was 90.9%; the 800 meters average of girls in the Dabancheng Middle School was $4'11'' \pm 19''$, the pass rate was 96.1%, from which we found that the endurance of girls in grade eight in the three schools had improved, but the schools still need to strengthen the students' endurance exercises.

The standing long jump average of girls in the Dabancheng Middle School was worse than that of other two schools, the excellent rate was 1.9%, the good rate was 15.4%, which showed that the Dabancheng Middle School should arrange more physical activities to improve strength of the students. The sits-up good rate and pass rate of the three middle were low, the good rate of three schools were 9.7%, 22.2% and 0%, the sits-up excellent rate were 3.2%, 6.1% and 0%, which suggested that most of the girls waist strength was weak, its need to be strengthened by practice.

The Sitting body flexion average was good, which suggested that the endurance was good. The 50 meters average was good, which suggested that the speed was good.

3.3 The Significant Difference Analysis Among Boys' Physical Fitness in Three Middle Schools in 2015

Table 3 ANOVA Analysis among Boys Physical Fitness in 2015

Year	Item		Sum of square	df	mean square	F	Sig.
2015	standing long jump	between group	4378.286	2	2189.143	2.841	.060
		group within the statistics	215785.629	280	770.663		
	sitting body flexion	between group	194.075	2	97.029	1.949	.144
		group within the statistics	13937.762	280	49.778		
	50 meters	between group	14.648	2	7.324	7.974	.000
		group within the statistics	259.934	283	0.918		
	Pull up	between group	738.395	2	369.198	18.827	.000
		group within the statistics	5549.706	283	19.610		
	1000 meters	between group	28131.149	2	14065.574	7.905	.000
		group within the statistics	503526.155	283	1779.244		

As it was seen from table 3, there was significant difference among boys' 50 meters results, F value was 7.974, sig. value was 0.000, $P < 0.05$. There was significant difference among boys' pull up results, F value was 18.827, sig. value was 0.000, $P < 0.05$. There was significant difference among boys' 1000 meters results, F value was 7.905, sig. value was 0.000, $P < 0.05$.

3.4 Multiple Comparisons and Influencing factors Analysis on Boys' Physical Fitness. Using the method of comparison between the two, we continued analyzing the items showing significant difference.

Table 4 Comparison Between the Two of Significant Difference Items

Year	Dependent variable	School(I)	School(J)	Mean difference (I – J)	Standard error	Sig.
2015	pull up	Affiliated	Seventh	.174	.619	1.000
			Dabancheng	-3.473*	.662	.000
		Seventh	Affiliated	-.174	.619	1.000
			Dabancheng	-3.647*	.655	.000
		Dabancheng	Affiliated	3.473*	.662	.000
			Seventh	3.647*	.655	.000
	50 meters	Affiliated	Seventh	.25579	.13391	.171
			Dabancheng	.57212*	.14326	.000
		Seventh	Affiliated	-.25579	.13391	.171
			Dabancheng	.31633	.14173	.079
		Dabancheng	Affiliated	-.57212*	.14326	.000
			Seventh	-.31633	.14173	.079

Table 4, cont.

1000 meters	Affiliated	Seventh	21.077*	5.894	.001
		Dabancheng	20.420*	6.305	.004
	Seventh	Affiliated	-21.077*	5.894	.001
		Dabancheng	-.657	6.238	1.000
	Dabanche ng	Affiliated	-20.420*	6.305	.004
		Seventh	.657	6.238	1.000

Using the method of comparison between the two of significant difference items, we can see from table 4 that there was significant difference of pull up between the Dabancheng Middle School and the Seventh School in Urumqi, the sig. value was 0.000, $p < 0.05$. The pull up average results of Dabancheng Middle School were better than other two schools, which was related to the rural boys usually participated in physical labor. There was significant difference of 50 meters between Affiliated Middle School of Xinjiang Normal University and the Dabancheng Middle School, sig. value was 0.000, $p < 0.05$. The average results of 50 meters in the Dabancheng Middle School were better, which was maybe related to less learning pressure and more physical activity. There was significant difference of 1000 meters among three middle schools and the average results of the Dabancheng Middle School were better.

3.5 The Significant Difference Analysis among Girls' Physical Fitness in Three Middle Schools in 2015

Table 5 ANOVA Analysis among Girls' Physical Fitness in 2015

Year	Item		Sum of square	df	mean square	F	Sig.
2015	standing long jump	between group	4378.286	2	2189.143	2.841	.060
		group within the statistics	215785.629	280	770.663		
	sitting body flexion	between group	667.132	2	333.566	8.276	.000
		group within the statistics	9713.308	241	40.304		
	50 meters	between group	9.329	2	4.665	7.438	.001
		group within the statistics	151.132	241	.627		
	sits-up	between group	1566.850	2	783.425	18.58 9	.000
		group within the statistics	10157.003	241	42.145		
	800 meters	between group	11827.731	2	5913.866	6.337	.002
		group within the statistics	224905.05 6	241	933.216		

As it was seen from table 5, there was significant difference among girls' 50 meters results, F value was 7.438, sig. value was 0.001, $P < 0.05$. There was significant difference among girls' sitting body flexion results, F value was 8.267, sig. value was 0.000, $P < 0.05$. There was significant difference

among girls' 800 meters results, F value was 6.337, sig. value was 0.000, $P < 0.05$. There was significant difference among girls' sits-up results, F value was, sig. value was 18.589 0.000, $P < 0.05$.

3.6 Multiple Comparisons and Influencing Factors Analysis on Girls' Physical Fitness. Using the method of comparison between the two, we continued analyzing the items showing significant difference.

Table 6 Comparison Between the Two of Significant Difference Items

Year	Dependent variable	School(I)	School(J)	Mean difference (I — J)	Standard error	Sig.
2015	sits-up	Affiliated	Seventh	-4.462*	.937	.000
			Dabancheng	1.568	1.124	.493
		Seventh	Affiliated	4.462*	.937	.000
			Dabancheng	6.029*	1.112	.000
		Dabancheng	Affiliated	-1.568	1.124	.493
			Seventh	-6.029*	1.112	.000
	sitting body flexion	Affiliated	Seventh	-3.1889*	.9168	.002
			Dabancheng	.4501	1.099	1.000
		Seventh	Affiliated	3.1889*	.9168	.002
			Dabancheng	3.6390*	1.087	.003
		Dabancheng	Affiliated	-.4501	1.099	1.000
			Seventh	-3.6390*	1.087	.003
	50 meters	Affiliated	Seventh	-.03051	.11436	1.000
			Dabancheng	.46061*	.13712	.003
		Seventh	Affiliated	.03051	.11436	1.000
			Dabancheng	.49112*	.13562	.001
		Dabancheng	Affiliated	-.46061*	.13712	.003
			Seventh	-.49112*	.13562	.001
	800 meters	Affiliated	Seventh	6.211	4.411	.481
			Dabancheng	18.818*	5.290	.001
		Seventh	Affiliated	-6.211	4.411	.481
			Dabancheng	12.607	5.232	.050
		Dabancheng	Affiliated	-18.818*	5.290	.001
			Seventh	-12.607	5.232	.050

Using the method of comparison between the two of significant difference items, we can see from table 6 that there is significant difference of sits-up between the Seventh School in Urumqi and other two schools, the sig. value was 0.000, $p < 0.05$, the sits-up results of the Seventh School in Urumqi are better. Through the comparison of sitting body flexion, we find out that there is significant difference among the three schools and the results of the Seventh School in Urumqi are better. Meanwhile, there is significant difference of 50 meters among the three schools, the sig. value respectively was 0.003、0.0001, $p < 0.05$, the results of the Dabancheng Middle School are better. There is significant difference of 800 meters between the Dabancheng Middle School and Affiliated Middle School of Xinjiang Normal University, the sig. value respectively is 0.0001, $p < 0.05$, the results of the Dabancheng Middle School are better.

From the above analysis ,we can be see that the eighth grade girls' speed and endurance fitness in rural middle school were better than that of key middle schools, while the waist strength and flexibility fitness of common middle is better than that of key middle school. We find out that the

same results from the comparison of the eighth grade boys' data. The result is related to the pressure of the key middle schools which makes the students spend more time studying, less time participating in physical activities. From the view of school, the key to solving the problem is to reduce the burden of students, especially do not take up the students physical education, extracurricular sports activities and after-school physical exercise time.

4.Result and Suggestion

4.1 From the Physical Fitness Results of Boys in Grade Eight in Three Middle Schools in 2015.

The results of pull up are poor, the results of 1000 meters are relatively poor, while the results of sitting body flexion, standing long jump are basically qualified while the results of 50 meters are better. The practice of limb and waist strength are needed.

4.2 From the Physical Fitness Results of Boys in Grade Eight in Three Middle Schools in 2015.

The excellent rate and good rate of sits-up are lower, which means the three middle school should pay more attention to the practice of leg and waist strengthen. The endurance fitness is better than before. The results of sitting body flexion and 50 meters are better.

4.3 There were Significant Difference Among Boys' 50 Meters, Pull Up and 1000 Meters in 2015. By continuously comparing between the two, we found that the results of the Dabancheng Middle School were better than the other two school.

4.4 There are Significant Difference Among Girls' 50 Meters, Sits-up, 800Meters and Sitting Body FLexion in 2015. By continuously comparing between the two, we find out that the results of the Dabancheng Middle School are better than the other two school.

4.5 From the View of School, the Key to Solving the Problem is to Reduce the Burden of Students. Especially do not take up the students physical education, extracurricular sports activities and after-school physical exercise time.

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