

Study on the Current Situation of Physical Fitness of Children Aged 3-6 in Nanchang City

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ABSTRACT. *In this paper, the literature method, measurement method, comparative analysis method and mathematical statistics method were used to investigate the children's physical fitness and body shape indicators of 408 children in 6 kindergartens in Nanchang City. This paper analyzes the physical condition of children aged 3-6 years in Nanchang City in 2018, and compares the differences in physical fitness between children in Nanchang City and children in the country, and finds the problems existing in the current growth and development of children. Through analysis and comparison, the following conclusions are drawn:*

KEYWORDS: *Nanchang city; Physique; 3-6 years old children; Body shape; physical fitness*

1) Body shape The height and weight indicators of children aged 3-6 in Nanchang City increased with age. The height and weight of all ages in Nanchang City are lower than the national average.

2) In terms of physical quality, through the comparative analysis of monitoring data of various projects, the flexibility of children in Nanchang City has been significantly improved; after 5 years old, the lower limb strength and explosive power of children in Nanchang City have been greatly improved; the explosive power of children in Nanchang City And the coordination ability has been greatly improved; but the upper body strength and reaction ability, balance ability and psychological quality of children in Nanchang City need to be strengthened.

1. Introduction

The enhancement of the national physical quality is the basis for the realization of the country's all-round development. The development of young children is the future of the nation and the country. In recent years, the state and the government have paid special attention to the monitoring of children's physical fitness. With the improvement of living standards, the development of children's physical

development has also followed Accelerated, so monitoring the physical fitness of young children is essential. It is especially important to further improve the physical quality of children in China and to study the growth and development of children's physique. It provides a scientific basis for the healthy growth of young children.

2. Research objects and methods

2.1 Research object

Taking the current situation of the physical fitness of children aged 3-6 years in Nanchang City as a valid data, the principle of stratified random cluster sampling was adopted to conduct sampling tests on 3-6 children in 6 kindergartens in Nanchang City. A total of 408 children with normal health and development were measured, including 223 males and 185 females, grouped by age group. As shown below, Table 1 shows the distribution of the number of children aged 3-6 years in urban areas of Nanchang.

Table 1 Distribution of the number of children aged 3-6 in Nanchang City

Gender	3 years old	4 years old	5 years old	6 years old
Male	50	74	74	25
Female	45	62	61	17
Total	95	136	135	42

2.2 Research methods

(1) Documentary Law

Through the China Knowledge Network to read relevant literature on children's physical fitness research, through the library of Jiangxi Normal University, read the books on physical measurement and evaluation and the laws and regulations related to children's physical fitness; and have an in-depth understanding of the relevant articles on the development of children's physical fitness at home and abroad. The comparative data in this paper uses the data of the 2014 National Physique Monitoring Bulletin. Theoretical guidance and preparation for this research.

(2) Measurement method

The measurement method is strictly monitored according to the method stipulated by the state, and the body physical indicators of the subject are tested. The body shape and physical quality of the child are tested according to the National Fitness Measurement Standard (children's part). By testing the data of 3-6 year old children in Nanchang City, we found problems in the growth and development of children in Nanchang.

(3) Mathematical Statistics

Organize and analyze the test data, and use the EXCEL form and SPSS statistical software to process and analyze the measured data. And drawn into a table, judged with the National Fitness Standards issued by the State Sports General Administration in 2003. More directly, the status quo of the physical fitness of 3-6 years old children in Nanchang City.

(4) Comparative Analysis

The data on the physical fitness of children measured in this year is compared with the data of Jiangxi Province and the whole country. The latest test data of the country is 2014, so refer to the 2014 National Physical Fitness Monitoring Bulletin (Children's Part). Understand the problems and deficiencies in the growth and development of 3-6 year old children in urban areas of Nanchang.

3. Research results and analysis

3.1 Analysis of the current situation of children's physical fitness in 3-6 years old in Nanchang City

(1) Analysis of body shape indicators

Height and weight are two important indicators for testing the body shape of young children.

1) Height

Height is an important indicator for assessing the development of children's bones and can reflect the growth and development of young children. See Table 2, as the age increases, the height of young children continues to grow, and the gap between boys and girls is growing. The 5-year-old male and female children had the largest difference in height and were very significant ($p < 0.01$).

Table 2 Analysis results of height data of children aged 3-6 years in Nanchang City
(cm)($\bar{x} \pm S$)

Age group	Male		Female		p
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	
3	50	99.39±4.12	45	97.85±4.71	
4	74	105.3±4.48	62	105.1±4.11	
5	74	112.8±4.58	61	110.7±4.06	**
6	25	115.8±5.03	17	115±6.20	

Note: Comparison between boys and girls of all ages,* $P < 0.05$;** $P < 0.01$.

2) Weight

The lateral development of young children can be reflected by the indicator of body weight. See Table 3, the 5-year-old male and female children have the largest difference in body weight, which is very significant ($p < 0.01$). The average weight of male children of all ages is heavier than that of female children.

Table 3 Analysis results of body weight data of children aged 3-6 in Nanchang City (kg)($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	16.15 ± 1.81	45	15.30 ± 1.85	
4	74	18.03 ± 2.52	62	17.36 ± 2.16	
5	74	20.74 ± 3.05	61	19.14 ± 2.40	**
6	25	22.42 ± 4.81	17	20.96 ± 3.18	

Note: Comparison between boys and girls of all ages, * $P < 0.05$; ** $P < 0.01$.

(2) Analysis of physical quality indicators

Physical fitness is the embodiment of the body's various functions of speed, endurance, strength, sensitivity and flexibility during the movement of the human body. It is an important basis for measuring the physical condition of the human body.

1) Sitting body flexion

Sitting position flexion can be a good response to the child's flexibility. See Table 4. The male child's positional flexion index decreases after 4 years old, and the female child's flexibility increases with age. The gap between children in each age group is very large, showing a very significant ($p < 0.01$). Flexibility Nanchang City female children are significantly better than male children.

Table 4 Analysis results of the forefoot flexion data of 3-6 years old children in Nanchang City (cm)($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	10.99 ± 3.97	45	13.35 ± 3.44	**
4	74	11.34 ± 4.43	62	14.08 ± 4.32	**
5	74	9.61 ± 3.96	61	14.35 ± 5	**
6	25	9.75 ± 4.88	17	15.09 ± 8.38	**

Note: Comparison between boys and girls of all ages, * $P < 0.05$; ** $P < 0.01$.

2) Tennis throws away

The throwing of the tennis ball mainly reflects the strength and explosiveness of the upper limb part and the waist and abdomen of the child. It can be seen from

Table 5 that with the increase of age, the average value of children's tennis throwing distance is also increasing, and the average data of each age group is larger than that of female children. The difference between male and female children at 5 years old was very significant ($p < 0.01$). The data indicates that the upper limbs and waist and abdomen strength of 3-6 year old male children in Nanchang City are better than female infants.

Table 5 Analysis results of tennis throwing data of 3-6 years old children in Nanchang City (m)($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	2.93 ± 2.58	45	2.19 ± 0.98	
4	74	3.56 ± 1.37	62	3.15 ± 1.04	
5	74	5.48 ± 1.76	61	4.32 ± 1.12	**
6	25	5.8 ± 1.73	17	4.92 ± 1.63	

Note: Comparison between boys and girls of all ages, * $P < 0.05$; ** $P < 0.01$.

3) Standing long jump

The standing long jump can reflect the explosive power of the lower limbs of young children. See Table 6. As the age increases, the level of children's long jump in Nanchang City is also increasing, and the gap between men and women is also growing. The lower limb strength of male children in Nanchang is obviously better than that of female children. At the age of 5, the gap between male and female children was significant ($p < 0.05$). The average data of long jump data of 3-6 years old boys and young children was 53.14-106.4cm, which was increased by 53.26cm. The data of female children's long jump changed to 51.71-98.24cm, which was increased by 46.53cm.

Table 6 Data analysis results of 3-6 years old children standing in Nanchang City (cm)($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	53.1 ± 13.93	45	51.7 ± 19.53	
4	74	74.7 ± 20.46	62	74.1 ± 15.27	
5	74	94.9 ± 18.15	61	88.3 ± 14.86	*
6	25	$106. \pm 13.40$	17	98.2 ± 14.13	

Note: Comparison between boys and girls of all ages, * $P < 0.05$; ** $P < 0.01$.

4) 10m foldback run

The 10m return run reflects the children's reaction ability and sensitive quality. See Table 7. The data of 3-6 year old male and female children in Nanchang City is 10.37-7.21s, which is increased by 3.16s. The data of female children aged 3-6 turns

back to 11.58. -7.66s, an increase of 3.92s. At the age of 3, the difference between male and female children was the largest, and the difference was very significant ($p < 0.01$). The 10m returning run of 3-6 year old male children in Nanchang City was faster than that of female children, indicating the sensitive quality of male children in growth and development. The reaction ability is better than that of female children.

Table 7 Data analysis results of 10m turn-back data for children aged 3-6 in Nanchang City ($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	10.37 ± 1.57	45	11.58 ± 2.56	**
4	74	8.75 ± 1.61	62	8.93 ± 1.16	
5	74	7.55 ± 1.07	61	7.59 ± 1	
6	25	7.21 ± 0.8	17	7.66 ± 0.62	

Note: Comparison between boys and girls of all ages, * $P < 0.05$; ** $P < 0.01$.

5) Continuous jumping of both feet

The two-legged continuous jump project mainly tests the lower limb strength of young children. See Table 8, the performance of the 3-6-year-old children in the urban area of Nanchang City is getting better and better. Males and young children of each age group were faster than female children, and there was no significant difference in each age group ($p > 0.05$). Among them, the continuous jumping data of boys and children's feet is 11.65-5.98s, which is increased by 6.13s. The continuous jumping data of female children's feet is 10.41-5.98s, which is 4.43s. The data shows that the 3-6 year old male children in Nanchang City have better lower limb strength and physical coordination ability than female children.

Table 8 Data analysis results of continuous jumping of children's feet in 3-6 years old in Nanchang City ($\bar{x} \pm S$)

Age group		Male		Female	
	n	$\bar{x} \pm s$	n	$\bar{x} \pm s$	p
3	50	11.65 ± 5.58	45	10.41 ± 4.76	
4	74	7.52 ± 3.15	62	8.11 ± 2.5	
5	74	6.24 ± 1.57	61	6.30 ± 1.55	
6	25	5.52 ± 0.99	17	5.98 ± 1.43	

Note: Comparison between male and female children of all ages, * $P < 0.05$; ** $P < 0.01$.

6) Walking the balance beam

Walking the balance beam project can well reflect the child's body balance. It

can be seen from Table 9 that the older the child is, the shorter the time taken to walk the balance beam and the better the balance ability. The 3-6 year old male children in Nanchang City took the balance beam time of 15.37-8.20s, which was 7.17s faster, and the 3-6 female children's balance beam time was 16.64-8.15s, which was 8.49s faster. The balance ability of male and female children aged 3-6 in Nanchang City is better than that of female children.

Table 9 Analysis results of balance beam data for children aged 3-6 years in Nanchang City ($\bar{x} \pm S$)

Age group	n	Male $\bar{x} \pm s$	n	Female $\bar{x} \pm s$	p
3	50	15.37±8.50	45	16.64±9.41	
4	74	12.20±6.94	62	12.64±6.52	
5	74	9.82±6.18	61	9.17±5.26	
6	25	8.20±3.22	17	8.15±4.32	

Note: Comparison between male and female children of all ages, *P<0.05; **P<0.01.

3.2 Differences between the physical fitness of children in Nanchang City and the national level in 2014

Analyze the physical fitness data of 3-6 year old children in Nanchang City tested in 2018, and compare with the data of the 2014 National Physical Fitness Monitoring Bulletin (children's section) issued by the State Sports General Administration to understand the physical condition of children in Nanchang City. The national level is different.

1) Comparison of body shape indicators of children in Nanchang City in 2018 and national 2014 indicators

As can be seen from Table 10, compared with the national data, the average height and weight of children in Nanchang are lower than the national average. This indicates that the data measured in 2018 in Nanchang City are lower than the national average.

Table 10 Comparison of mean values of body shape indicators between children in Nanchang City and children in China

area	gender	Age group	Height (cm)	Weight (kg)
Nanchang City	Male	3	99.39	16.15
		4	105.36	18.03
		5	112.85	20.74
		6	115.82	22.42
	Female	3	97.85	15.30
		4	105.10	17.36

		5	110.71	19.14
		6	115	20.96
National	male	3	102.2	16.6
		4	107.8	18.3
5		114	20.6	
6		119.7	23	
	Female	3	100.9	15.9
		4	106.5	17.5
		5	112.7	19.6
		6	118.1	21.6

(2) Comparison of the physical fitness indicators of children in Nanchang City in 2018 and the national 2014 indicators

It can be seen from Table 11 that the measurement data of the forefoot position of the infants in Nanchang City is higher than the full index in each age group, especially for female children; the average value of the tennis long-term long jump index is lower than the national index; The average value of the 10m turn-back running index of all age groups of male and female children is lower than the national average; the average value of the balance beam index of male and female children in all age groups is significantly higher than the national average. This shows that the flexibility of children in Nanchang City is better than the national level. The upper limb strength, lower limb strength and balance ability are worse than the national level; except for 6 years old, the sensitivity, speed quality and reaction ability of male and female children in Nanchang City are better than the national level.

Table 11 Comparison of mean values of physical fitness indicators for children in Nanchang City and children in the country

area	gender	Age group	Sitting body flexion(cm)	Tennis throwing away (m)	Standing long jump (cm)	10m foldback run (s)	Walking balance beam (s)
Nanchang City	Male	3	10.99	2.93	53.14	10.37	15.37
		4	11.34	3.56	74.18	8.75	12.64
		5	9.61	5.48	94.92	7.55	9.82
		6	9.75	5.8	106.4	7.21	8.20
	Female	3	13.35	2.19	51.71	11.58	16.64
		4	14.08	3.15	74.73	8.93	12.20
		5	14.35	4.32	88.38	7.59	9.17
		6	15.09	4.92	98.24	7.66	8.15
National	male	3	9.1	3.7	64.6	16.8	9.4
		4	8.0	4.7	80.4	12.1	7.6
		5	7.1	6.2	96.7	8.4	6.3
		6	6.6	7.7	107.9	6.2	5.7
	Female	3	9.4	3.1	61.8	17.2	9.9
		4	8.3	3.9	76.6	12.2	7.7
		5	7.4	4.8	90.7	8.5	6.4

		6	7.0	5.9	100.1	6.4	5.8
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4. Conclusions

1) In terms of body shape, the height and weight indicators of children aged 3-6 years in Nanchang City increased with age and showed an increasing trend year by year. The height and weight of all ages in Nanchang City are lower than the national average.

2) In terms of physical fitness, most indicators have improved. In addition to the sitting body flexion, the physical indicators of male children are better than female children. In comparison with the national average, the index of the forward position of the child in the Nanchang City and the 10m return run are higher than the overall national average. The indexes of tennis throwing away, standing long jump and walking balance beam are lower than the national average. The flexibility, sensitive speed quality and reaction ability of children in Nanchang City are higher than the national average. However, the upper limb strength, lower limb strength and balance ability of children in Nanchang are worse than the national average.

References

- [1] Yang Jingwei (2010). Research on the status quo of physical fitness of children aged 3-6 years in urban area of Chengdu. Sichuan Normal University.
- [2] State Sports General Administration (2015). 2014 National Physical Fitness Monitoring Bulletin. State Sports General Administration.
- [3] Jiangxi Provincial Sports Bureau (2015). 2014 Jiangxi Provincial Physical Fitness Monitoring Bulletin. Jiangxi Provincial Sports Bureau.
- [4] Wei Shurui (2013). Analysis of the impact of sports games on the development of children's body and mind, pp.262.
- [5] Han Wei (2010). Study on the physical characteristics of children aged 3-6 years in Nanchang City in 2010. Jiangxi Normal University.
- [6] Lü Rong, Qiu yi, Cha Qipeng (2014). Study on the Characteristics of Physical Fitness of Children Aged 3-6 in Nanchang City in 2014. Journal of Anhui Sports Science, pp.31
- [7] Liu Jianwei (2012). Research on the status quo of children aged 3-6 years old in Baoding City. Hebei Normal University.
- [8] Shi Yinzhen (2016). The current situation of physical fitness of children aged 3-6 in Sichuan Province--Based on the analysis of physical fitness monitoring data in 2014. Chengdu Sports Institute.
- [9] Liu Wei (2012). New Thoughts on the Development of Kindergarten Sports Activities in the New Period. Contemporary Sports Science and Technology, vol.2, no.4, pp.46-49.
- [10] Chen Xiaojun, Wang Ruijing, Zhang Na (2009). Study on the physical condition of the aged children in Jining City, Shandong Province. Shandong Sports Science and Technology, vol.31, no.4, pp.97-98