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PHYSICAL STATUS OF 5-6-YEAR-OLD PRESCHOOL BOYS IN HANOI, VIETNAM

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Abstract:
Quality physical education during the preschool years lays a strong foundation for a child's overall development. Recognizing this importance, the present study aims to provide data on the physical condition of 5- to 6-year-old male preschool children in Hanoi, Vietnam. To achieve this objective, the study employed a combination of methods, including document referencing, surveys, pedagogical testing, anthropometric measurements, and statistical analysis. The study involved 1,790 male preschool children aged 5–6 years in Hanoi. The findings indicate that these children show superior physical attributes compared to their peers in Central Vietnam, Dong Thap Province, and Ho Chi Minh City, particularly in terms of standing height, flexibility, and balance ability. However, they demonstrated lower performance in explosive strength of the lower limbs and speed. Additionally, the average Body Mass Index (BMI) of the children falls within the normal range, and their Pignet Index is classified as average.

Keywords: status, physical, preschool boys, 5 – 6 years old, Hanoi, Vietnam

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1. Introduction

President Ho Chi Minh placed great emphasis on the education and well-being of children and teenagers, recognizing their critical role in the future of the country. He once wrote, "*Children are the future owners of the country. Therefore, taking good care of and educating children is the duty of the government, the party, and the entire society. This work must be carried out persistently and steadfastly for the future of the people*" [1]. He also underscored the importance of education, particularly early childhood education, in shaping the next generation. For him, education was not just about imparting knowledge and morality but also about nurturing physical health. As he said, "*…Success in preserving democracy and building the country demands healthy citizens. Healthy individuals can contribute to make a nation stronger, while weak citizens weaken it*" [2].

In line with this vision, on April 28, 2011, the Prime Minister issued Decision No. 641/QD-TTg, approving the project for the physical development of Vietnamese citizens from 2011 to 2030. This decision emphasized the importance of physical foundation and development, particularly for those aged 3 to 18 years [3]. With the special and profound attention of the Party and the State toward preschool children, especially those of pre-primary age, numerous studies have been conducted in recent decades to support and promote the development of children in this age group across various fields such as medicine, psychology, and pedagogy. Among these are notable doctoral dissertations by authors such as Lam Tuyet Thuy (2008) [4] and Nguyen Hung Dung (2021) [5]. These studies are particularly noteworthy because physical development is an essential factor contributing to the comprehensive development of children both physically and mentally. As author Ngo Thi Xuan stated: *"...the turning point at six years old is an important event that researchers in child health must pay attention to. On one hand, it helps children actively prepare to gradually adapt to learning activities and school life; on the other hand, it supports their comprehensive and balanced development in both physical and emotional aspects."* [6]. Accurate, comprehensive, and scientific information about children's physical condition serves as the foundation for developing effective solutions to promote physical development among preschoolers. Given this importance, we conducted the study entitled: *"The Physical Status of 5–6 Yea-Old Preschool Boys in Hanoi, Vietnam"*

The purpose of this study is to provide information on the physical condition of 5–6-year-old male preschool children in Hanoi, Vietnam.

2. Methodology

2.1 Document Reference Method

This method aims to consult, synthesize documents, and systematize information related to the research topic, thereby forming a theoretical basis, building scientific hypotheses, determining objectives, and verifying research results.

2.2 Survey Method

This method is to consult experts to select physical assessment tests for research subjects. The study uses direct and indirect surveys of teachers, experts, and managers who have extensive experience in the field of physical education for the age group.

2.3 Pedagogical Testing Method

This method is used to check the reliability and informativeness of the selected physical assessment tests. The tests are selected from the reference to the preschool education and care program of the Ministry of Education and Training, the Department of Preschool Education, and from the survey results of experts, officials, and teachers who have participated in preschool education.

2.4 Anthropometric Method [7]

This method aims to examine morphological indicators, also known as anthropometry, which is a scientific measure of the structure and external shape of the human body. The study uses the Standing height (cm), weight (kg), BMI index (kg/m ^{2}), and Pignet index scales.

2.5 Statistical Mathematical Methods

This method is used to analyze the collected data. The data in the topic is entered and processed based on the data analysis software SPSS for Windows version 22.0 [8] to process the data. The study uses the formulas for mean value, standard deviation, and testing the mean value of two independent samples.

2.6 Research Object

A sample of students participating in the assessment of the current situation is 1790 preschool children aged 5-6 years old in 06 districts of Hanoi (Ha Dong district, Nam Tu Liem district, Thanh Oai district, Chuong My district, Thach That district, Son Tay town) were selected by a random and convenient method.

A sample of students participating in testing the reliability and informativeness of the Test involves 375 male preschool children aged 5-6 years old at 03 preschools (Phung Chau, Tien Phuong, Dai Yen) in Chuong My district, Hanoi, Vietnam. They were selected by the random and convenient method.

A sample of experts participating in the survey to select physical assessment tests includes 24 teachers, professionals, and administrators who were approached in a judgmental and random manner.

3. Results and Discussions

3.1 Determination of Physical Assessment Tests for 5-6-year-old Male Preschool Children in Hanoi

To determine physical assessment tests for 5-6-year-old male preschool children in Hanoi, the study was conducted in 3 steps:

Step 1: Synthesize physical assessment tests for 5-6-year-old preschool children from research works of domestic and foreign authors such as Duong Nghiep Chi et al. (2013) [9], Lam Tuyet Thuy (2008) [4], Nguyen Hung Dung (2021) [5], Nguyen Thi Yen (2023) [10], Cadenas-Sanchez, C., et al. (2019) [11], Ortega, F. B (2015) [12], Amado-Pacheco et al. (2019) [13], Reisberg, K. et al. (2021) [14], Gustat J et al. (2000) [15], Yoo, EG (2016) [16], Sardinha, L. B et al. (2016) [17], Lan, NT P et al. (2023) [18], Ministry of Health (2021) [19], Ngo Xuan Khoa, Le Gia Vinh, Tran Quang Huy et al (2021) [20], obtaining 19 tests.

Step 2: Survey 24 experts, teachers, and preschool administrators.

Step 3: Check the reliability and informativeness of the tests
Through the above steps, the study identified 10 physical assessment tests for 5-6-year-old male kindergarten students in Hanoi as follows:

- **Body fitness (3 tests):** Standing height (cm), BMI (kg/m ^{2}), Pignet index.
- **Physical fitness (6 tests):** 10m sprint (s), Standing long jump (cm), Grip strength (kg), Sit-and-reach flexibility (cm), Zigzag run through 5 poles (seconds), Single-leg balance (seconds).

3.2 Assessment of the Physical Status of 5-6-year-old Male Preschool Children in Hanoi

To assess the physical condition of 5-6-year-old male preschool children in Hanoi, the study conducted tests identified in section 3.1, then calculated the parameters $\overline{X}$, S, C_V, and ε obtained the results in Table 1 as follows:

Table 1: Physical status of 5-6-year-old male preschool children in Hanoi (n = 1790)

No.	Criteria	$\overline{X}$	S	CV	ε
1	Standing height (cm)	114.16	5.02	4.40	0.00
2	BMI index (kg/m ^{2})	15.43	2.57	16.64	0.01
3	Pignet index	35.63	4.92	13.82	0.01
4	10m sprint (s)	2.83	0.33	11.68	0.01
5	Grip strength (kg)	9.37	0.45	4.79	0.00
6	Standing long jump (cm)	95.60	10.91	11.41	0.01
7	Sit-and-reach flexibility (cm)	5.76	3.35	58.14	0.03
8	Zigzag run around 5 poles (seconds)	9.06	0.66	7.25	0.00
9	Single-leg balance (seconds)	9.23	0.73	7.91	0.00

The coefficient of variation (C_V) is a parameter that reflects the variability among individuals in the sample set and population. As shown in Table 1, all the indices show high homogeneity, which indicates that there is a small dispersion of variation ($C_V < 10\%$) among the students. Several test indicators involving standing height, grip strength,

zigzag run, and single-leg balance are always highly consistent, as they are less affected by environmental factors such as diet, lifestyle, etc. At the same time, they are also indicators measured by a ratio scale, which is a scale with an absolute "zero".

The indices exhibit moderate uniformity among the study participants (10% < C_V < 20%), including the BMI index, Pignet index, 10-meter sprint and standing long jump. However, the sit-and-reach flexibility index shows low homogeneity (C_V > 30%).

Although the variation between individuals in the sample set and the population is quite large for some indicators, the sample mean values are sufficiently representative ($\varepsilon < 0.05$), making them suitable for subsequent analysis and evaluation.

The average BMI of 5-6-year-old male preschool children in Hanoi is 15.43 kg/m², which falls within the normal range according to the nutritional status assessment table for children aged 5 to 19 years, based on the Z-score (WHO, 2007) [21], [22].

Statistical analysis of BMI classification for 5-6-year-old male preschool children in Hanoi is presented in Table 2.

Table 2: BMI classification statistics for 5-6-year-old preschool boys in Hanoi (n = 1790)

No.	BMI Classification	Number of individuals	Proportion
1	Underweight	611	34.13
2	Normal weight	766	42.79
3	Obesity	413	23.08
Total		**1790**	**100.0**

As seen in Table 2, 611 children are classified as underweight, accounting for 34.13%, 766 children are classified as having normal weight, accounting for 42.79%, and 413 children are classified as obese, accounting for 23.07%.

The average Pignet index of 5-6-year-old male preschool children in Hanoi is 35.63, which is classified as average. Statistical analysis of the physical fitness classification of 5-6-year-old male preschool children in Hanoi based on the Pignet index is presented in Table 3.

Table 3: Pignet index statistics on the physical fitness of 5-6-year-old male preschool children in Hanoi (n = 1790)

No.	Pignet Classification	Quantity	Proportion
1	Very weak	720	40.22
2	Weak	468	26.15
3	Average	498	27.82
4	Strong	70	3.91
5	Very strong	34	1.90
Total		**1790**	**100.0**

Table 3 shows that 720 children are classified as very weak, accounting for 40.22%, 468 children are classified as weak, accounting for 26.15%, 498 children are classified as average, accounting for 27.82%, 70 children are classified as strong, accounting for 3.91%, and 34 children are classified as very strong, accounting for 1.90%.

The assessment of any phenomenon should be conducted based on a comparison with a standard or another object of the same type. Hence, the study was conducted to compare the physical status of 5-6-year-old preschool children in Hanoi with that of their counterparts in other regions. The data is taken from the studies of Lam Tuyet Thuy (2008) [4], Nguyen Hung Dung (2021) [5], and Phan Thi My Hoa (2021) [23]. In his comparison, a one-sample t-test is applied (comparing theoretical mean values) to obtain the results shown in Table 4.

Table 4: Comparison of the physical health of 5-6-year-old males preschool children in Hanoi with those of the counterparts in Central Vietnam (X_1) [4], Dong Thap province (X_2) [5], and Ho Chi Minh City (X_3) [23]

	Criteria	$\overline{X}$	SD	$\overline{X_1}$	$\overline{X_2}$	$\overline{X_3}$	P 1	P 2	P 3
Male (n = 1790)	Standing height (cm)	114.16	5.02	112.4	113.59	-	<0.05	<0.05	-
	BMI index (kg/m 2)	15.43	2.57	-	16.67	-	-	<0.05	-
	Pignet index	35.63	4.92	-	-	-	-	-	-
	10m sprint (s)	2.83	0.33	2.65	2.82	2.57	<0.05	>0.05	<0.05
	Grip strength (kg)	9.37	0.45	-	-	-	-	-	-
	Standing long jump (cm)	95.60	10.91	95.71	96.63	95.05	>0.05	<0.05	<0.05
	Sit-and-reach flexibility (cm)	5.76	3.35	2.31	5.16	2.91	<0.05	<0.05	<0.05
	Zigzag run around 5 poles (seconds)	9.06	0.66	-	9.11	-	-	<0.05	-
	Single-leg balance (seconds)	9.23	0.73	8.47	-	-	<0.05	-	-

Table 4 indicates that:

The physical fitness of 5-6-year-old preschool children in Hanoi exceeds that of their peers in Central Vietnam in the tests of standing height, sit-and-reach flexibility, and single-leg balance. Their performance is similar in explosive strength (standing long jump) but lags in speed (10m sprint). Thus, it can be concluded that the physical fitness of 5-6-year-old preschool children in Hanoi is superior in standing height, flexibility, and balance, comparable in lower limb strength, but weaker in speed.

The physical fitness of 5-6-year-old preschool children in Hanoi is superior to that of their peers in Dong Thap province in terms of standing height, sit-and-reach flexibility, and zigzag run. Hanoi's children also have a higher BMI. Moreover, both groups perform similarly in the 10m sprint test, but Hanoi's children show lower performance in the standing long jump. In short, the preschool boys in Hanoi excel in height, flexibility, and agility, and have a higher BMI. They also perform equally in speed, but underperform in explosive strength when compared to those in Dong Thap province.

The physical fitness of 5-6-year-old preschool children in Hanoi is considered better than that of their peers in Ho Chi Minh City in the tests of standing long jump and sit-and-reach flexibility. However, Hanoi's children perform worse in the 10m sprint test. Thus, it can be suggested that the young children in Hanoi have greater flexibility and explosive strength in their lower limbs, but they have lower speed compared to those in Ho Chi Minh City.

4. Conclusion

The physical fitness of 5-6-year-old male preschool children in Hanoi exceeds that of children in Central Vietnam, Dong Thap province, and Ho Chi Minh City in standing height, flexibility, and balance ability. However, they show no advantage in the explosive strength of lower limb muscles or speed. The average BMI of Hanoi's male preschoolers is 15.43 kg/m², which falls within the normal range, and their Pignet index is rated as average.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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