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PHYSICAL ASSESSMENT TESTS FOR 5-6-YEAR-OLD MALE PRESCHOOLERS IN HANOI, VIETNAM

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Abstract:
Physical education plays a crucial role in the comprehensive development of individuals, so it should be implemented from an early age, even during the preschool period. It is believed that proper physical education during this stage can lay a strong foundation for a child's lifelong physical development. Hence, this study aims to select a number of physical assessment tests for 5- to 6-year-old preschool boys in Hanoi, Vietnam. The research employed document referencing, surveys, pedagogical tests, and statistical analysis methods. The study sample consists of 375 preschool boys aged 5 to 6 in Chuong My District, Hanoi, Vietnam. The findings have identified ten physical assessment tests, including standing height (cm), BMI (kg/m^2), Pignet index, 10-meter sprint (seconds), standing long jump (cm), handgrip strength (kg), forward bend (cm), slalom run through five poles (seconds), and one-leg balance (seconds).

Keywords: tests, physical health, 5-6 years old, Hanoi, Vietnam

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1. Introduction

Children are the happiness of a family and the future of a nation, so the practice of protecting, caring for, and educating children is the responsibility of the State, society, and each family. For a long time, humanity has taken different measures to safeguard, nurture, and educate children, maximizing their intellectual and physical potential in alignment with biological laws and the advancements of the era.

Preschool age is an important stage of physical and mental development. During this crucial period, children are influenced by both direct and indirect factors. At this stage, their muscles, bones, and internal organs are still developing, making them highly susceptible to continuous minor external influences, which can lead to long-term physical and mental deviations. Several studies have indicated that increased consumption of high-energy, high-fat foods, reduced physical activity, unhealthy eating and lifestyle habits, and urbanization are among the risk factors affecting children's physical development [1]; [2]; [3].

The physical development of preschool children is affected by certain factors such as individual and racial genetic traits, nutritional intake, environmental conditions, and living conditions. All these factors can influence metabolic processes in the body, affect cells and effector organs (organs that carry out inner reactions), impact the nervous system and endocrine glands, and thereby regulate the maturation process of children [4].

Physical education in preschool primarily helps children stay active, build healthy habits, and develop strong bodies. It includes activities like exercise, movement games, and proper hygiene. These efforts help children to grow in a balanced way and achieve optimal physical fitness as a foundation for personality development. Caxusec (Russia), Luong Van Hoa, Chu Thang Tien, Tran Quan Anh (China), and Tamaxita (Japan) have suggested that sports and physical education for young children are highly necessary in raising well-rounded individuals for the future [5], [6], [7]. Therefore, early childhood physical education is an investment in developing future citizens as well as contributing to the country's health in the long run.

To design suitable physical exercises, it is essential to have accurate information about students' physical fitness. To do it, it is necessary to have a list of reliable physical assessment tests that fit the students' current physical status. Recognizing this importance, this study has been conducted with a title as follows: *"Physical Assessment Tests for 5-6-year-old Male Preschoolers in Hanoi, Vietnam".*

The study aims to identify physical assessment tests for 5–6-year-old male preschool children in Hanoi, Vietnam.

2. Methodology

2.1 Document Reference Method

This method aims to analyze and synthesize relevant materials to form a theoretical basis, build scientific hypotheses and determine research aims. The results of the document reference play a role as a foundation to select research methods and discuss the findings.

2.2 Survey Method

The study developed a questionnaire to identify the importance level of each physical assessment test for preschool children. The study used a survey method involving physical education teachers, experts, and managers who have extensive experience in such a field.

2.3 Pedagogical Testing Method

This method is used to test some physical assessment tests for preschool children. The tests were selected based on references to the preschool education program from the Ministry of Education and Training, Early Childhood Education Department, and results from surveys with experts, professionals, and staff.

2.4 Anthropometric Method [8]

This method involves checking morphological indices, also known as anthropometry, which is the science of measuring the structure and appearance of the human body.

2.5 Statistical Method

This method is used to analyze the collected data. The data in the study were entered and processed using the SPSS software for Windows version 22.0 [9]. The study used formulas for average values, standard deviation, Pearson correlation coefficients, and factor analysis.

2.6 Research Subject

The research sample consists of 375 preschool boys aged 5-6 years from 3 preschools in Chuong My District, Hanoi, selected through random and convenience sampling.

The survey participants consisted of 24 lecturers, professionals, and managers, selected using judgmental and random methods.

3. Results and Discussions

To identify physical assessment tests for 5-6-year-old male preschool children in Hanoi, the study was carried out in three steps:

Step 1: Synthesize physical assessment tests for 5-6-year-old preschool children from research works by both domestic and international authors.

The author conducted the analysis on a number of research conducted by domestic and international authors, including Duong Nghiep Chi et al. (2013) [10], Lam Tuyet Thuy (2008) [11], Nguyen Hung Dung (2021) [12], Nguyen Thi Yen (2023) [13], Cadenas-Sanchez, C., et al. (2019) [14], Ortega, F. B (2015) [15], Amado-Pacheco et al. (2019) [16], Reisberg, K. et al. (2021) [17], Gustat J et al. (2000) [18], Yoo, E. G. (2016) [19], Sardinha, L. B et al. (2016) [20], Lan, N. T. P. et al. (2023) [21], Ministry of Health (2021) [22], Ngo Xuan Khoa, Le Gia Vinh, Tran Quang Huy et al. (2021) [23]. The results of the synthesis were 19 physical assessment tests for 5-6-year-old preschool boys.

Step 2: Survey experts, managers, and preschool teachers.

The study developed a questionnaire and conducted surveys with nineteen tests with the experts who have experience in physical education for preschool children. The survey responses were rated on a scale from 1 to 5 points: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree.

Two rounds of surveys were also conducted to test the consistency between the two surveys through the index χ^2 (squared), obtaining the results presented in Table 1.

Table 1: Survey results of physical assessment tests of 5-6-year-old male kindergarten children in Hanoi city

	Tests	1st (n = 24)		2nd (n = 24)		Statistics	
		Total	%	Total	%	χ^2	Sig
I	**Body fitness**						
1	Standing height (cm)	112	93.33	112	93.33	0.00	1.00
2	Weight (kg)	82	68.33	80	66.67	0.06	0.80
3	BMI (kg/m²)	108	90.00	110	91.67	0.17	0.68
4	QVC index	86	71.67	84	70.00	0.07	0.80
5	Pignet index	98	81.67	100	83.33	0.10	0.76
6	Waist-to-height ratio (cm/cm)	86	71.67	84	70.00	0.07	0.80
7	Waist circumference (cm)	86	71.67	86	71.67	0.00	1.00
II	**Physical strength**						
1	10-meter sprint (seconds)	108	90.00	108	90.00	0.00	1.00
2	20-meter sprint (seconds)	86	71.67	84	70.00	0.07	0.80
3	Standing long jump (cm)	108	90.00	108	90.00	0.00	1.00
4	Handgrip strength (kg)	96	80.00	98	81.67	0.09	0.76
5	One-handed throw with dominant hand (cm)	86	71.67	84	70.00	0.07	0.80
6	Two-handed overhead throw (cm)	88	73.33	90	75.00	0.07	0.79
7	100-meter sprint (seconds)	82	68.33	80	66.67	0.06	0.80
8	Sit-and-reach test (cm)	108	90.00	108	90.00	0.00	1.00
9	Forward bend (cm)	84	70.00	82	68.33	0.07	0.80
10	Slalom run through 5 poles (seconds)	100	83.33	100	83.33	0.00	1.00
11	Shuttle run 4 x 10m (seconds)	86	71.67	86	71.67	0.00	1.00
12	One-leg balance (seconds)	96	80.00	98	81.67	0.09	0.76

The results in Table 1 show that across the two rounds of surveys, all the tests had a χ^2 calculated < χ^2 table (= 3.84) and Sig > 0.05, meaning that the difference between the two observed values of the sample is not statistically significant at the 5% probability level. Therefore, the results from the two rounds of surveys with experts, professionals, managers, and teachers show a high level of agreement in their responses. The survey results selected tests with a total score > 75% of the total points in both rounds of surveys (> 90 points). Based on this principle, the study identified 9 physical assessment tests for preschool boys aged 5-6 years in Hanoi, as follow: Standing height (cm), BMI (kg/m²), Pignet index, 10-meter sprint (seconds), Standing long jump (cm), Handgrip strength (kg), Forward bend (cm), Slalom run through 5 poles (seconds), One-leg balance (seconds).

Step 3: Test the Reliability and Informativeness of the Tests

The tests identified to assess body fitness include height (cm), BMI (kg/m²), and Pignet index. These tests have been widely used for all subjects, are stable, and are measured using modern and accurate equipment, so there is no need to revalidate their informativeness.

a. Test the Reliability

According to Duong Nghiep Chi (2004) [24], Le Van Lam, Pham Xuan Thanh (2007) [25], 'The correlation coefficient between two variables (the results of the test in the first and second rounds) is used to assess the reliability of the test.

The study determined the reliability of the test using the method described above; it conducted two rounds of testing with a 5-day interval between the two rounds, ensuring that the testing conditions were the same for both rounds. The correlation coefficient (r) between the test results from the two rounds was then calculated, and the results are presented in Table 2.

Table 2: Reliability coefficient of tests evaluating the physical fitness of male 5-6 years old preschoolers in Hanoi City

No.	Tests	1st		2nd		Reliability index	
		$\overline{X}$	S	$\overline{X}$	S	r	Sig
1	10-meter sprint (seconds)	2.88	0.34	2.93	0.35	0.99	<0.01
2	Handgrip strength (kg)	9.30	0.43	9.29	0.42	0.97	<0.01
3	Standing long jump (cm)	93.41	10.92	93.16	10.71	0.98	<0.01
4	Sit-and-reach test (cm)	6.15	2.95	6.02	2.79	0.96	<0.01
5	Slalom run through 5 poles (seconds)	9.03	0.64	9.02	0.60	0.98	<0.01
6	One-leg balance (seconds)	9.34	0.76	9.30	0.75	0.98	<0.01

Table 2 shows that all the physical assessment tests for preschool boys aged 5-6 years in Hanoi have a reliability coefficient r >0.8 and sig<0.01. In other words, these tests are reliable enough to assess the physical fitness of the research subjects.

The study also tests the informativeness of the research tests based on the analysis above, conducting factor analysis [101, pp. 29-30] on the physical fitness tests for preschool children aged 5-6 years in Hanoi as follows:

The subjects for the informativeness test were 375 preschool boys aged 5-6 years in Hanoi. The program used to perform the factor analysis was IBM SPSS Statistics 22.0. The results are presented in Tables 3 and 4.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.782
Bartlett's Test of Sphericity	**Approx. Chi-Square**	152.153
	df	18
	Sig.	.000

As shown in Table 3, the factor analysis in this study is appropriate (KMO > 0.6, sig. < 0.05).

Table 4: Rotated Factor Matrix

Tests	**Component**	**Sig**
10-meter sprint (seconds)	0.782	<0.05
Handgrip strength (kg)	0.768	<0.05
Standing long jump (cm)	0.638	<0.05
Sit-and-reach test (cm)	0.746	<0.05
Slalom run through 5 poles (seconds)	0.592	<0.05
One-leg balance (seconds)	0.589	<0.05

Table 4 shows the correlation coefficients between the tests and the central factor (physical fitness). All of the tests have a correlation coefficient with the physical fitness factor r>0.4r and sig<0.05. This means that the selected tests are informative regarding the physical fitness of preschool boys aged 5-6 years in Hanoi. Among them, the test with the highest informativeness is the 10-meter sprint (XPC) with r=0.782, while the test with the lowest informativeness is the One-leg balance (seconds) (r=0.589).

Through the steps of literature review, surveys, and testing reliability and informativeness, the study has identified ten physical assessment tests suitable for preschool boys aged 5-6 years in Hanoi, including:

- **Body fitness (3 tests):** Standing height (cm), BMI (kg/m^2), Pignet index.
- **Physical strength (7 tests):** 10-meter sprint (seconds), Standing long jump (cm), Handgrip strength (kg), Forward bend (cm), Slalom run through 5 poles (seconds), One-leg balance (seconds).

4. Conclusion

The research has selected 9 tests with sufficient reliability and informativeness to assess the physical fitness of preschool boys aged 5-6 years in Hanoi. Those tests include the following:

- **Body fitness (3 tests):** Standing height (cm), BMI (kg/m^2), Pignet index.
- **Physical strength (6 tests):** 10-meter sprint (seconds), Standing long jump (cm), Handgrip strength (kg), Forward bend (cm), Slalom run through 5 poles (seconds), One-leg balance (seconds).

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

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