

# Physical Exercise System Structure with Tools for Preschool Children 4-5 Years old Hanoi City

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Received: 10 Jun 2023; Received in revised form: 13 Jul 2023; Accepted: 23 Jul 2023  
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## Abstract

*Structure of physical exercise system with equipment for preschool children 4-5 years old Hanoi City: The structure of the physical exercise system with equipment for 4-year-old preschool children in Hanoi City, of 8 groups with 35 exercises with equipment for the age of 4 is (1) Group of movement exercises; (2) Group of stretching exercises; (3) Group of exercises that stimulate height growth; (4) Group of orientation exercises; (5) Group of exercises for upper limb development; (6) Group of exercises for lower limb development; (7) Group of skillful development exercises; (8) Group of mixed exercises. Structure of physical exercise system with equipment for 5-year-old preschool children in Hanoi City, including 35 exercises of 8 groups oriented to physical development of 5-year-old children: (1) Group of movement exercises; (2) Group of stretching exercises; (3) Group of exercises that stimulate height growth; (4) Group of orientation exercises; (5) Group of exercises for upper limb development; (6) Group of exercises for lower limb development; (7) Group of skillful development exercises; (8) Group of mixed exercises.*

**Keywords—** Preschoolers, exercises with tools, Hanoi.

## I. INTRODUCTION

In modern life, physical exercise with equipment (gymnastics) is one of the basic means of harmonious physical development that is not only attractive to adults but also to children, invested by many families in going to the gym from preschool age. Exercise as well as physical activities from an early age, not only has the effect of exercising but also helps to stimulate the simultaneous development of both hemispheres of the brain. This is something that few smart tools or toys can do. However, for children up to 3-6 years old, to maintain regular practice, besides the guidance of teachers at the center, parents also need to pay attention to learning to have the right method, to help children easily absorb lessons in class and bring their children comfort when participating in exercises.

The gymnastic model for children has been formed and developed in advanced countries in the world (USA, Europe, Canada, Japan, Korea...) for over 20 years. Gyms are not only attractive to adults, but children are also being invested by many families to go to school from preschool age. In big cities like Hanoi, Ho Chi Minh City,

Ho Chi Minh City, Da Nang ... The practice of letting children go to the gym is a new trend for many families with progressive awareness in education and raising children. Accordingly, the training centers are built quite modern, large-scale, with large space, divided into many areas such as a swing practice area, balance bridge, acrobatics, climbing wall, cable swing area, ball pool, private practice area ... to serve the children. Exercise will affect the development of all organs and postures of the body, increasing the height of the child; Forming the child's personality; Good impact on children's thinking; Fine movement of the hands... Teaching gymnastics to children is very difficult because it is related to children's physiology and psychology.

Report on research results made by the method of document analysis and synthesis; expert methods, mathematical and statistical methods; processing the survey results of 30 experts on the 5-level Likert scale. The mean value of the Likert scale used in expert interviews on the approval of the structure of gym exercises for preschool children. Distance value = (Maximum–Minimum)/n = (5-1)/5 = 0.8. The meanings of

the levels are as follows: 1.00 – 1.80: Strongly disagree; 1.81 – 2.60: Disagree; 2.61 – 3.40: Confused; 3.41 – 4.20: Agree 4.21 – 5.00: Strongly agree and test the reliability of Cronbach's Alpha.

## II. RESEARCH RESULTS AND DISCUSSION

### 2.1. Structure of exercises with equipment for preschool children 4-5 years old in Hanoi city

Approaching the Master Project on physical development and stature of Vietnamese people for the period 2011-2030 of the Prime Minister of Vietnam (Project 641), through reference to documents and expert advice, initially synthesized the structure of the exercise system with equipment for preschool children 4-5 years old in Hanoi, with 35 exercises in 8 groups of exercises oriented to children's physical development:

System of exercises with equipment for preschool children 4 years old	System of exercises with equipment for preschool children 5 years old
<b>I. Group of exercises to move</b>	
1. Move sideways on the deflection bar	1. Backward movement on the high bridge with an assist
2. Move forward on the high bridge	2. Move forward kicking with sandbags on the high bridge
3. Move on tiptoe on a low bridge	3. Move backward on the high bridge with a sandbag
4. Move forward on the double bar	4. Move sideways kicking with sandbags on a high bridge
5. Traverse on the low bridge with sandbag	5. Move on tiptoe kicking sideways on an assisted low bridge
<b>II. Group of exercises to stretch the body</b>	
1. Single-beam swing	1. Double beam swing
2. Suspension ring swing	2. Assisted hoist ring swing
3. Double beam swing	3. Swing the hanging ring straight
4. Straight-legged suspension ring	4. Single-beam swing, two-arm body backward with support
5. Assisted with hanging ring	5. Left-right body swing with support
<b>III. Group of exercises to stimulate height growth</b>	
1. Jump on the straight-legged barbell (with support)	1. Jump and jump on the barbell
2. Jump on the knee-jumping pull-up bar (with assistance)	2. Jump up and down the pull-up bar
3. Jumping on the foot lift (with support)	3. Jump on the straight-legged barbell
4. Jump on the high-leg split barbell (with support)	4. Jump up and down the pull-up bar with both hands on your back
5. Jump up and down the barbell (with support)	5. Turn upside down on the sloped carpet
<b>IV. Orientation exercise group</b>	
1. Balance on your stomach on a low bridge	1. Balance on your stomach on a high bridge
2. Complete belly-balancing on an assisted high bridge	2. Move on tiptoe - Balance on your stomach on an assisted high bridge
<b>V. Group of exercises to develop upper limbs</b>	
1. Hands-on supported barbell	1. Hands on the double bar
2. Hands-on supported double beams	2. Hands on the double beam of the body
3. Hands on the double-knee bar	3. Hands on the double-knee bar

4. Hand support on steep carpets (with support)	4. Bananas leaning against the wall
5. Hands on the double bar raise the legs	5. Supported hand bananas
<b>VI. Group of exercises to develop lower limbs</b>	
1. Split-foot barbell swing	1. Split foot swing on the skewed bar
2. Pull up the bar with legs	2. Swinging with your feet on the skewed bar
3. Double leg lift swing	3. Swing leg lift
4. Double-knee swing	4. Anti-collision, high-leg separation keeps V on a low bridge with support
<b>VII. Group of exercises to develop dexterity</b>	
1. Upside down on the steep carpet	1. Move forward on the low bridge with support at the end of the bridge
2. Upside down on a flat mat	2. Move on the high bridge with support at the end of the bridge
3. Upside down, split feet on a sloped carpet with support	3. Jump in place on the low bridge with support
4. Upside down and separate feet on the sloping carpet	4. Assisted foot switch on a low bridge
<b>VIII. Mixed exercise group</b>	
1. Arms and legs on the casket	1. Shoulder banana with one leg raised over the shoulder with support
2. Bending on the hexagon with support	2. Upside down through obstacles
3. Lying on the bridge with support	3. Upside down combination upside down
4. Standing on a bridge on a hexagon with support	4. Bending combined upside down on hexagon with support
5. Supported V-shaped arm and leg support	5. Supported upside-down combined bridge

The system of exercises with the above equipment includes exercises oriented on: Exercises to develop height; Movement exercises; Exercises that develop a sense of balance are related to the ability to judge direction; Exercises to develop specific physical qualities; Exercises to straighten and stretch the spine (Cobra Stretch). The structure of gym exercises needs to adhere to the following principles: Combine modern training methods with many triathlons; To bring into full

play the child's qualities; Stimulation helps to grow taller, and maintain a suitable weight.

## 2.2. Testing the structural reliability of the physical exercise system with tools for preschool children 4-5 years old, Hanoi city

Testing the reliability of the structure of the physical exercise system with tools for 4-year-old preschool children in Hanoi city, presented in Tables 1 and 2.

Table 1. Structural results of the exercise system with instruments for 4-year-old preschool children in Hanoi city through expert opinion (n=30)

No	Group orientati on exercises	Structure of the exercise system with equipment	Strongl y agree 5 points	Agr ee 4 poin ts	Confused 3 points	Disagree 2 points	Strongly disagree 1 point	Average (means)	Difference
1	Group of exercises to move	Move sideways on the deflection bar; Move forward on the high bridge; Move on tiptoe on the low bridge;	24	8	4	2	1	4.40	0.28

		Move forward on the double bar; Move sideways on a low bridge with sandbags.							
2	Group of exercises to stretch the body	Single swing; Swinging swings with legs; Double swing; Swing hanging straight leg; Supported body swing.	23	5	2	1	1	4.53	0.32
3	Group of exercises to stimulate height growth	Jumping straight-legged barbell swing; Jump up and down swinging barbell with knees bent; Jumping on the barbell with your feet up; Jumping on the swing with your legs apart; Jump on the barbell swing (with support).	25	9	3	1	2	4.33	0.28
4	Orientati on exercise group	Balance on your stomach on a low bridge; Balance on your stomach on a high bridge (assisted).	21	6	1	1	1	4.50	0.29
5	Group of exercises to develop upper limbs	Hands on the bar; Hands-on double beams; Hands on the double-knee bar; Stand up against the steep carpet; Hands-on leg lifts (with support).	22	3	2	2	1	4.43	0.3
6	Group of exercises to develop lower limbs	Swinging bar with split legs; Pull-up barbell with legs; Double-leg swing; Double-knee swing.	18	4	4	2	2	4.13	0.23
7	Group of exercises to develop	Upside down on a sloping carpet; Upside down on a flat mat; Upside	22	5	1	1	1	4.53	0.3

	dexterity	down, split feet on a supportive slope mat; Roll your feet up and down on the sloped carpet.								
8	Mixed exercise group	Arms and legs on the casket; Bending on the hexagon with support; Assisted lying on the bridge; Standing bridge bending on the hexagon with support; Anti-slip armrest with high support to hold the V-shape	20	6	4	1	1	4.30	0.23	

Table 2. Results of testing the reliability of the exercise system structure Physical training with equipment for 4-year-old preschool children Hanoi City (n=30)

Factor	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Criteria 6	Criteria 7	Criteria 8	Total score	Total variance score $\sigma_y^2$	
Point	1	21	23	21	21	22	18	22	18	166	3554.0
	2	4	3	3	6	3	4	5	6	34	
	3	2	2	3	1	2	4	1	4	19	
	4	2	1	1	1	2	2	1	1	11	
	5	1	1	2	1	1	2	1	1	10	
Variance by column $\sum \sigma_x^2$	23.6	73.6	38	23.6	64.4	23.6	19.6	42			
Total variance by column	<b>454.0</b>										
Cronbach's Alpha( $\alpha$ )	<b>0.8946</b>										

$$\alpha = \frac{K}{K-1} \left( 1 - \frac{\sum \sigma_x^2}{\sigma_y^2} \right)$$

Where: K is the observed variable  $\sigma_x^2$  :  
 Total Independent Variance

$$\sigma^2_y : \text{Total Variance}$$

Through Tables 1 and 2, it is shown that experts agree and strongly agree on the structure of the physical exercise system with equipment for 4-year-old preschool children in Hanoi, of 8 groups with 35 exercises with equipment for age 4 are (1) Movement exercises group (mean 4.40); (2) Group of stretching exercises (mean 4.53); (3) Group of exercises to stimulate height development (mean 4.58) ; (4) Group of exercises for orientation ability (mean 4.33); (5) Group of exercises to

develop upper limbs (mean 4.50); (6) Group of exercises to develop lower extremities (mean 4.43); (7) Group of exercises to develop dexterity (mean 4.53); (8) Mixed exercise group (mean 4.30); Reliability Cronbach's Alpha ( $\alpha$ )0.8946.

For 5-year-old preschoolers, the results of structure and reliability testing of the physical exercise system with tools are presented in Tables 3 and 4.

*Table 3. Results of the structure of the physical exercise system with tools for 5-year-old preschool children in Hanoi city through expert opinion (n=30)*

No	Exercise group	Structure of the exercise system with equipment	Strongly agree 5 points	Agree 4 points	Confused 3 points	Disagree 2 points	Strongly disagree 1 point	Average (means)	Difference
1	Group of exercises to move	Backward movement on the high bridge with an assist; Move forward kicking with sandbags on the high bridge; Move backward on the high bridge with sandbags; Move sideways kicking feet with sandbags on high bridges; Move on tiptoe kicking sideways on an assisted low bridge.	14	9	4	2	1	4.10	0.82
2	Group of exercises to stretch the body	Double swing; Swing with support body; Swinging pull-up bar with two hands with support; Left and right body swing with support.	23	4	1	1	1	4.47	0.89
3	Group of exercises to stimulate height growth	Jumping and swinging on the barbell; Jump up and down swinging barbell with knees bent; Jumping	17	8	4	1	0	4.58	0.69

		straight-legged barbell swing; Jumping and swinging on the pull-up bar with both hands holding back; Turn upside down on the sloping carpet.							
4	Orientati on exercise group	Balance on your stomach on a high bridge; Move on tiptoe with support on a raised bridge.	14	9	4	2	1	4.10	0.82
5	Group of exercises to develop upper limbs	Hands-on double beams; Hands on the double beam of the body; Hands on the double-knee bar; Hands leaning against the wall; Supported hand banana.	22	3	2	2	1	4.43	0.89
6	Group of exercises to develop lower limbs	Split foot swing on the deflection bar; Swinging on the slanted beams; Swing leg lift; Anti-stretching arm and high leg keep V on the low bridge with support.	14	9	4	2	1	4.10	0.82
7	Group of exercises to develop dexterity	Move forward on the low bridge with support at the end of the bridge; Move on a high bridge with support at the end of the bridge; Jumping in place on the low bridge with support; Assisted foot switch on the low bridge.	12	10	5	3	0	4.03	0.81

8	Mixed exercise group	Shoulder bananas bend one leg upside down over the supported shoulder; Flip over obstacles; Upside down combination upside down; Bending combined upside down on hexagon with support; Supported upside-down combined bridle.	18	7	4	1	0	4.13	0.69
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Table 4. Results of testing the reliability of the exercise system structure Physical training with equipment for 5 -year-old preschool children Hanoi City (n=30)

Factor	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Criteria 6	Criteria 7	Criteria 8	Total score	Total variance score $\sigma^2_y$	
Point	1	14	23	17	14	22	14	12	18	134	2184.4
	2	9	4	8	9	3	9	10	7	59	
	3	4	1	4	4	2	4	5	4	28	
	4	2	1	1	2	2	2	3	1	14	
	5	1	1	0	1	1	1	0	0	5	
Variance by column $\sum \sigma_x^2$	23.6	73.6	38	23.6	64.4	23.6	19.6	42			
Total variance by column	<b>308.4</b>										
Cronbach's Alpha ( $\alpha$ )	<b>0.8808</b>										

$$\alpha = \frac{K}{K-1} \left( 1 - \frac{\sum \sigma_x^2}{\sigma_y^2} \right)$$

Where: K is the observed variable  $\sigma_x^2$  :  
Total Independent Variance  
 $\sigma_y^2$  : Total Variance



Through Tables 3 and 4, it is shown that experts agree and strongly agree on the structure of the physical exercise system with equipment for 5-year-old preschool children in Hanoi, of 8 groups with 35 exercises with equipment for age 5 are (1) Movement exercises group (mean 4.10); (2) Group of stretching exercises (mean 4.47); (3) Group of exercises to stimulate height development (mean 4.58) ; (4) Group of exercises for orientation (mean 4.10); (5) Group of exercises to develop the upper limb (mean 4.43); (6) Group of exercises to develop lower extremities (mean 4.10); (7) Group of skillful development exercises (mean 4.03); (8) Mixed exercise group (mean 4.13); Reliability Cronbach's Alpha( $\alpha$ )0.8808.

### III. CONCLUSION

From the basic approach, the structure of the physical exercise system with equipment for 4-year-old preschool children in Hanoi, of 8 groups with 35 exercises with equipment for age 4 is (1) Group of mobility exercises; (2) Group of stretching exercises; (3) Group of exercises to stimulate height development; (4) Group of exercises for orientation; (5) Group of exercises to develop upper limbs; (6) Group of exercises to develop lower limbs; (7) Group of exercises to develop dexterity; (8) Mixed exercise group.

The structure of the physical exercise system with tools for 5-year-old preschool children in Hanoi, including 35 exercises of 8 groups oriented to the physical development of 5-year-old children are (1) Group of movement exercises; (2) Group of stretching exercises; (3) Group of exercises to stimulate height development; (4) Group of exercises for orientation; (5) Group of exercises to develop upper limbs; (6) Group of exercises to develop lower limbs; (7) Group of exercises to develop dexterity; (8) Mixed exercise group.

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