

## DETERMINING THE LEVEL OF PHYSICAL DEVELOPMENT OF PRESCHOOL CHILDREN

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**Annotation.** An assessment of the physical development of preschool children. The study involved 74 children - 5 years (34 girls and 40 boys) and 84 pre-school children - 6 years (37 girls and 47 boys). Functional status was determined by measuring the heart rate at rest, lung capacity and sample Rufe. It was established that the children surveyed index indicator corresponds to the level of physical development is above average. Determined that the parameters of the functional state of preschool children meet the age norm. It is established that the determination of physical performance in preschool children 5-year life of the average level detected, and the children of the 6th year of life - satisfactory. It is shown that the average anthropometric measures sex-age groups correspond to the performance of preschool children surveyed, except for girls 6 years.

**Keywords:** physical, development, senior, pre-school age.

### Introduction

Problems of pre-school age children's physical development, strengthening and preservation of their health can not lose its urgency. Especially it concerns the present time, as far as in some pre-school establishments quantity of sick children reaches 50-90%. Just owing to this fact, in compliance with Laws of Ukraine "On pre-school education" and "On physical culture and sports", physical education of pre-school children is oriented, first of all, on protection and strengthening of psychic and physical health of children, on strengthening of organism's immune system, education of stable interest to motion activity, formation of vitally necessary motion skills, abilities and physical qualities (quickness, endurance, dexterity, coordination, flexibility), formation of health culture [2, 6]. Alongside with it, data of numerous researches witness that to day approximately 80% of children have one or several diseases, 40% of pre-school children have abnormalities of posture and 56% have insufficient physical condition [4].

In modern conditions of computerization, aggravation of social problems, unsatisfactory ecological conditions in Ukraine full-fledged development of children, rising of their organisms' adaptation level become of great importance. In such conditions just physical education can be special kind of activity, which would facilitate training of physical and moral qualities, optimization of psychic processes, which are connected with formation of harmoniously developed child's personality [5, 7].

Pre-school age – is a period, when the most intensive processes of organism's growth and development, formation of child's personality are going on. Exactly in this age the basis of future health state, physical condition, mental activity are embedded, which are extremely required for comprehensive harmonious development of a child [8, 10, 11].

A lot of researches are devoted to problems of pre-school age children's physical development and healthy life style of rising generation (O.L. Boginich, Ye.S. Vilchkovskiy, N.F. Denisenko, L.A. Svarkovska, I.I. Brekhman, O.D. Dubogay, R.Z. Potashniuk). At the same time, recent years there has been existing a trend to reduction of physical condition's level of pre-school children. It conditions search of new systemic approaches to application of physical education means in educational process of senior pre-school age children [1,3,9].

The problem of the present work corresponds to plan of scientific & research works of department of physical education's theory and methodic of National University of physical education and sports of Ukraine and to "Combined plan of scientific & research work in sphere of physical culture and sports for 2011-2015" by subject 3.1 "Improvement of program-normative principles of physical education in educational establishments" (state registration № 0111U001733).

### Purpose, tasks of the work, material and methods

*The purpose of the research* is determination of physical condition of senior pre-school age children.

*The tasks of the research:*

1. Studying of some indicators of physical condition and functional state of pre-school age children.
2. Evaluation of physical condition's level of senior pre-school children.

*The methods of the research:* theoretical analysis and generalization of scientific and methodic literature, pedagogic observation, anthropometrical methods physiological methods and methods of mathematical statistics.

*Organization of the research.* At the beginning of 2012 we examined children of pre-school educational establishments No.23 (Vinnitsa) among whom there were 74 children of 5 years old age (34 girls and 40 boys) and 84 pre-school children of 6 years old age (37 girls and 47 boys). For evaluation of their physical conditions we used indices, which characterize interconnection between different anthropometrical indicators: height, chest circumference. By dynamics of children's growth and development it is possible to judge about their health, physical and psychic welfare.

### Results of the research

For evaluation of physical condition's level we calculated index of physical condition as per O. Dubogay:

$$IPC = H - (W + CC),$$

Where: H – height in position standing upright, cm; W- weight, kg; CC- chest circumference, cm;

Evaluation of physical condition of senior, pre-school children's bodies (as per O. Dubogray) showed that for 5 years old boys this indicators was  $38.8 \pm 0.41$  conv. un., for girls –  $39.7 \pm 0.48$  conv.un. For boys of 6 years old this indicator was  $41.8 \pm 0,6$  conv.un. for girls –  $42.2 \pm 0.51$  conv.un. (see table 1).

Table 1

*Indicators of physical condition and functional state of senior pre-school age children*

Age	Sex	Indicators							
		Index of physical conditions, conv.un.		Heart beat frequency (HBF) b.p.m <sup>-1</sup>		Vital capacity of lungs (VCL) ml		Ruffiet's test, conv.un.	
		$\bar{x}$	S	$\bar{x}$	S	$\bar{x}$	S	$\bar{x}$	S
5 years old (n=74)	B	38.8	0.41	91	7.4	890	175.4	8.1	3.2
	G	39.7	0.48	94	7.1	860	150.6	9.8	5.2
6 years old (n=84)	B	41.8	0.6	87	6.5	1090	236.8	10.0	3.9
	G	42,2	0.51	87	9.5	1060	961.5	10.0	5.2

Notes: B- boys; G- girls.

Comparative analysis of physical condition indicators of the tested children of senior pre-school age with the help of age standard (O. Dubogray, 2003) showed that this indicator of 5-6 years old boys and girls corresponds to level above middle.

Results of examination of cardio-vascular system's functional state of senior pre-school children are an important characteristic, which is included in evaluation of physical health and, therefore, children's physical condition. Functional state of children's cardio-vascular system is not only central indicator of health; it is important for adaptation of organism to physical loads and is one of main indicators of functional abilities.

Evaluation of functional state of pre=school children's cardio-vascular system was evaluated with the help of pulse metering in rest, measuring of vital capacity of lungs and Ruffiet's test. As per Ye.S. Vilchkobskiy (1998) heart beat frequency in rest shall be 80-100 b.p.m for children of this age. We registered the following results: 5 years old girls –  $S=94$  b.p.m<sup>-1</sup>, boys –  $S=91$  b.p.m<sup>-1</sup>; mean arithmetic of 6 years old children (both girls and boys) was 87 b.p.m<sup>-1</sup>. So pulse indicators in rest of 5-6 years old examined children corresponded age standard and prove the fact that girls have pulse higher than boys [2].

Functional state of children's respiratory system was examined with the help of spirometry method, which permitted to determine vital capacity of lungs. Analysis of table 1 data can help to determine that mean VCL indicators of 5-6 years old examined children correspond to middle level (as per data of M.M. Bezrukikh et al., 2002) and are 890 – 1090 ml, accordingly. But both some boys and some girls of 5-6 years old had indicators, corresponding to high level – 1500 – 1700 ml that witnesses about substantial individual discrepancies in the examined group of children.

For determination of physical workability of cardio-vascular system we used functional test of Ruffiet. The results, obtained by us, permitted to make conclusions about satisfactory level of physical workability of 6 years old boys and girls ( $S=10.0$  conv.un.). Level of physical workability of 5 years old boys and girls is higher (girls–  $S=9.8$  conv.un.; boys –  $S=8.1$  conv.un.) and corresponds to middle level (see table 1).

It is known that evaluation of physical state is carried out by comparing of anthropometrical indicators of the tested with mean indicators of sex-age group.

As results of our researches witness, mean indicator of 5 years old girls' height is  $109.9 \pm 5.9$  cm, and 6 years old girls –  $116.5 \pm 4.6$  cm, i.e. increases by 6.6 cm. With it, in 5 years old age, difference between maximal (117 cm) and minimal (100 cm) height is 17 cm, that says about different rates of physical development of this age girls. Difference between maximal (123 cm) and minimal (108 cm) height – 15 cm - of 6 years old girls also witnesses about non-uniformity of group.

Boys of middle group (5 years old) show a little higher indicators of height–  $110.8 \pm 5.7$  cm and difference between maximal (120 cm) and minimal (100 cm) height is 20 cm (see table 2).

Table 2

*Mean indicators of physical condition of senior pre-school age children*

Age	Sex	Anthropometrical indicators					
		Height, cm		Body mass, kg		Chest circumference, cm	
		$\bar{x}$	S	$\bar{x}$	S	$\bar{x}$	S
5 years old (n=74)	B	110.8	5.7	19.0	3.2	55.5	4.0
	G	109.9	5.9	18.0	3.1	53.1	5.5
6 years old (n=84)	B	117.8	4.5	20.5	1.9	58.8	2.7
	G	116.5	4.6	19.9	2.5	57.7	2.5

Notes: B- boys; G- girls.

At the age of 6 years old (senior group) mean indicator of height is 117.8 cm for boys, with it, maximal value is 124 cm and minimal – 106 cm. Difference of indicators is 18 cm. Height of boys increases by 7 cm in the period from 5 to 6 years and of girls – by 6.6 cm, that permits to say about absence of any significant difference in dynamics of height indicators of boys and girls, but witnesses about confident differences between indicators of 5 years old children and 6 years old ones.

Body mass of girls increases by 1.9 kg in the period from 5 to 6 years old age. With it, in 5 years old age mean mass indicator is 18 kg (maximal indicator is 22 kg and minimal – 13 kg) and difference equals to 9 kg that shows substantial difference in individual indicators in this age. In 6 years old age difference reduces to 8 kg.

Approximately the same rates of body mass increment are shown by boys, where in the period from 5 to 6 years old mass of body increases by 1.5 kg. Mean mass indicator of 5 years old boys is 19 kg (maximal value – 24 kg and minimal – 13.3 kg with difference of 10.7 kg). For 6 year old boys difference is 7.5 kg (between maximal value of 24.5 kg and minimal – 17.0 kg) and mean indicator is 20.5 kg. Thus, we can see different rates of body mass increment of examined children.

Indicators of chest circumference of girls increase by 4.6 cm from 5 to 6 years old age. Mean indicators of 5 years of girls is  $53.1 \pm 5.5$  cm, (maximal - 62 cm, minimal– 45 cm, difference– 17 cm). 6 years old girls have the following indicators: mean arithmetic –  $57.7 \pm 2.5$ cm, maximal– 63 cm, minimal– 54 cm, difference– cm.

Boys of this age group have increasing of chest circumference indicators a little less than girls – 3.3 cm. Like girls they have significant individual differences. For example for 5 years old age mean arithmetic is  $55.5 \pm 4.0$  cm (maximal value is 61 cm, minimal – 48 cm, difference – 13 cm). For boys of 6 years old age difference is 9 cm; so we can say that girls have a little bit higher rates of this indicator's increment (8.7%) than boys (6.0%).

Comparing indicator of body mass of 5 years old pre-school children with mean indicator of child's development (see table 3) we can see that boys meet norm but girls have less mass of body. 6 years old children have less mass of body (both boys and girls).

Table 3

*Mean indicators of pre-school children's physical condition*

Age	Sex	Anthropometric indicators		
		Mass of body, kg	Height, cm	Chest circumference, cm
4 years old	B	$16.8 \pm 0.9$	$101.7 \pm 2.3$	$53.6 \pm 1.4$
	G	$16.2 \pm 1.2$	$100.7 \pm 2.7$	$52.7 \pm 1.1$
5 years old	B	$18.8 \pm 1.2$	$109.2 \pm 2.8$	$55.7 \pm 1.4$
	G	$18.5 \pm 1.7$	$110.3 \pm 2.7$	$53.6 \pm 1.6$
6 years old	B	$21.4 \pm 2.4$	$116.7 \pm 2.7$	$58.7 \pm 1.8$
	G	$21.2 \pm 2.6$	$115.3 \pm 3.3$	$58.3 \pm 1.93$

Notes: B- boys; G- girls.

Comparing height indicators and chest circumference with mean indicators of pre-school children physical condition (see table 3) we can state that anthropometrical indicators practically do not differ; only 6 years old girls have chest circumference less ( $\bar{x} = 57.7$  cm), than it must be as per physiological norm.

**Conclusions:**

1. Results of our research have witnessed that indicator of physical condition's index of 5-6 years old examined children corresponds to level above middle. Indicators of functional state (HBF in rest, VCL) meet age standard. Evaluation of workability of cardio-vascular system of 5 years old children showed its middle level and concerning 6-years old children – satisfactory level.
2. Comparing anthropometrical indicators of the examined pre-school children with mean indicators of sex-age group we can state certain compliance, videlicet of height and chest circumference (except 6 years old girls).

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