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Original scientific paper

PHYSICAL ACTIVITY, PHYSICAL FITNESS AND HEALTH AMONG PRESCHOOL AGE CHILDREN IN LITHUANIA

INTRODUCTION

About 30% of six-year-old children in Lithuania are immature for school, fitness of the first-graders is low, dynamics of working capacity is unfavourable, different problems are very frequent among preschool age children and those in primary grades (Armonienė, 1997; Dilienė, 1999; Dailidienė et al., 2000; Birontienė, 2005; Juškeliienė, 2008). Review of literature leads to the conclusion that only some components of children's physical condition and peculiarities in the development of physical activity have been analyzed so far (Blair et al., 2001; Dregval et al., 2008). Most of these works are methodological recommendations for pedagogues in preschool institutions (Šumskas et al., 2006; Malina et al., 2004; Šarkauskienė et al., 2008; Volbekienė et al., 2007). Therefore, we focused the research on the physical activity among preschool age children and attempted to reveal links between physical activity, physical fitness and health.

The aim of the research was to perform the analysis of physical activity among children of preschool age (5-6-year-old), its links with health state and physical fitness.

The tasks of the research:

1. Examine size and intensity of physical activity among 5-6-year-old children.
2. Define impact of physical activity upon physical fitness and health state.

Methods of the research: identification of the size and intensity of physical activity, health state, modified Eurofit tests, pedagogical experiment, questionnaire completed by children, their parents and tutors, mathematical statistics.

Organization of the research

The sample consisted of 127 children aged 4-5 who participated in the research. Experimental groups consisted of 35 boys and 46 girls, control groups – of 24 boys and 22 girls. First experimental (E_1) group was working according to our programme of physical activity and health improvement, which included conditions, stimulating

physical activity of children and satisfying each child's demand for movement. Physical activity was to be developed, but not impeded or forbidden. Children in E₂ group, unlike those in E₁ group, were provided with conditions for free-chosen type of activity. Control group (C) was working according to „Vėrinėlis“ (Chaplet) programme, approved by the Ministry of Education and Science, which prescribes no organized forms of children's physical education. Pedagogues are free to choose when and how to educate children.

Three diagnostic researches were performed: in the medium group at the beginning of the school year and in the senior group at the beginning and at the end of the school year. We defined physical fitness of children by tests, evaluating agility, flexibility, power, precision and coordination of motions. For that purpose we employed modified Eurofit tests.

We analyzed the following parameters of physical activity: amount, intensity and content. We evaluated amount and intensity according to duration of motions and quantity of performed motions, whereas content was evaluated according to monitoring protocol and timing.

Health evaluation

We recorded childhood diseases and their time (when, how long), identified neurotic troubles, estimated impact of physical activity upon state and sleep. *Questionnaire completed by children, their parents and tutors* was introduced, which included questions about health state, physical activity, interest in physical activity, living conditions, education.

RESULTS OF THE RESEARCH

Results of 1st, 2nd and 3rd research stages showed how *physical fitness* of children in the experimental and control groups was changing. Physical fitness of children in all three groups improved in their 5th and 6th year. Improvement of agility and flexibility was insignificant, whereas indicators of power, motion precision and coordination improved considerably. A significant improvement of results in long throw with both left and right hands was discovered. They show that 6-year-old boys in E₁ group, compared to 5-year-olds, threw a 200 g sand-bag with their right hand 47.0 cm ($p < 0.05$) further and 35.3 cm ($p < 0.05$) further with their left hand. Greater positive changes were discovered also among indicators of long throw results in E₂ group. Boys and girls in all groups managed to throw the sand-bag considerably further with their right hand than their left hand. Children master right hand throwing motions easier than left hand motions. Though possessing a certain amount of power, they are not able to employ it in the process of motion performance. Results of the test

in a bound forward, sit and reach, 3 x 5 shuttle run and throw into vertical target also increased. Results of all these tests were better in E₁ group, compared to those in E₂ group and much better than in C group. It shows that physical fitness of children in E₁ group was better compared to that of children in E₂ and C groups. Children in E₁ group were very active and willingly participated in exercises of physical training. Besides, they were provided with conditions for satisfaction of motion demands; educators were developing their physical activity. It was not impeded or forbidden. Physical activity was planned and organized systematically and purposefully. Children in E₂ group were also provided with favourable conditions for physical activity and they could come to athletic fields at any time to exercise and play, however, organized classes in physical training were not exercised. Pedagogues were encouraging them to exercise, though it was done indirectly. Attention was basically focused on individual non-regulated physical activity, allowing children to choose spheres of activity and intensity of motions. Physical load was episodic.

It was found that *physical activity* of children attending preschool institutions made only 24.3% of daily wakeful time, though standard amount of physical activity has to be around 50 % of this time.

Average number of motions, performed each day by 5-year-old children in group E₁, was 16,049: girls – 14,041, boys – 18,057. Children in E₂ group performed daily about 14,992 motions: girls – 12,502, boys – 17,483. On the average, children in the control group were performing 11,618 motions: girls – 9,598, boys – 13,639. Physical activity of children in their sixth year increased in all groups, though greater positive changes were discovered in experimental groups, compared to those in the control group. Received data about physical activity show that physical activity of boys in E₁ group increased on the average by 12.1%. Increase of physical activity of children in the control group was smaller, compared to that of 5-year-old children and made 5.7% among boys and 5.1% among girls.

Table 1. Level of basic indicators of physical activity of 5-6 year old children

Year	Indicators of physical activity	Level of indicators (number of motions, minutes, number/per minute)		
		low	medium	high
5	amount	5024-6439	6440-8331	8332-11048
	duration	55-70	71-92	59.0-76.2
	intensity	29.2-49.0	48-58.0	59-76.2
6	amount	5326-7520	7521-9632	9633-12461
	duration	67-82	83-105	106-136
	intensity	30.2-50.0	51.0-65.0	66.0-90.0

Boys were more active than girls. However, when analyzing individual data about physical activity of children, it emerged that some girls were much more active than boys.

Table 2. *Distribution according to levels of physical activity*

(in the final stage of research)

Levels of physical activity	Groups		
	E1	E2	C
Low	1.0%	13.4%	35.2%
Medium	64.5%	79.9%	58.5%
High	34.5%	6.7%	6.3%

It was discovered that both boys and girls were more active in the first part of a day (a.m.). For example, girls in E1 group performed on the average 9,059 motions in the morning, boys – 13,487 motions, whereas in the afternoon that number was smaller (4,402 among girls and 5,150 among boys). Therefore, children were more active in the first half of the day. We also discovered that motion activity increased about 35% each time the number of children in groups decreased (no more than 12). It can be easily explained. Micro-climate in groups becomes better, there is enough space for children to move, it is much easier for the educator to achieve better quality of physical activity: motion diversity, intensity, etc.

Seasonal differences in physical activity of children were also identified. Physical activity of both 5 – 6-year-old boys and girls in spring – summer period appeared to be higher, compared to that of autumn – winter period. It is necessary to pay attention to the fact, when creating pedagogical conditions for physical activity of children.

Among basic indicators, identifying optimal motion mode, there were **individual differences** (amount and intensity) of physical activity among 5 – 6-year-old children throughout entire day. Actual individual data about physical activity throughout entire day and across seasons were following: among 5-year-old children – from 11,618 to 16,049 motions, among 6-year-old children – from 12,294 to 18,470 motions.

Children's morbidity

Research data show that diseases among children in the control group in their sixth year of life were more frequent than among those from experimental groups ($p < 0.05$). After comparison of children's morbidity with the data about physical activity, we noticed that the more frequently they were ill, the lower their physical activity was. In the period of research individual number of children's cases in E1 group varied from 1 to 3 times, in E2 group – from 1 to 4 times, in C group – from 1 to 8 times. Number of girls among those cases is larger, though sexual differences are statistically unreliable ($p < 0.05$). Cases among children with lower level of physical activity were more frequent ($p < 0.005$). 1-3 cases or more were recorded among children of low physical activity (54.3%), whereas in groups of medium and high physical activity it made 26.2% and 18.3% accordingly.

Analysis of data showed that some 6-year-old children experienced different neurotic troubles. They were more frequent among children from the control group (31.2%), compared to those from experimental groups (15.3%) ($p < 0.05$). Least complaining about neurotic problems were physically active children (2.3%). Half of the questioned children from the control group stated they were feeling badly at kindergarten and 31% of them experienced insomnia in the evening. In the experimental groups only 12% of children were complaining about these troubles.

We found that children's mood was changing positively after physical activity. It was typical among 84% of children (40% of boys and 44% of girls ($p < 0.005$)). Our research revealed that 94% of children were sleeping sound throughout entire time of afternoon sleep after active movement in the first half of day. 83% of them were sleeping restfully. On the average, sleep of children with lower motion rate was 35 min shorter. We also came across children who did not want to sleep at all; 3.3% of them were children of low physical activity, 0.8% - of medium physical activity and 1.5% - of high physical activity. Thus, optimal motion mode stimulates healthy sleep.

CONCLUSIONS

1. Physical activity of preschool age children has an individual character. A properly arranged movement regime and activity and stimulating educational environment help to increase children's physical activity.
2. Education system makes impact on physical activity, physical fitness and health of those trained. Important role in this process belongs to pedagogues and family.
3. Children's physical activity, physical fitness and health are closely interrelated.

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ABSTRACT

The aim of the research was to make analysis of physical activity among children of preschool age (5 – 6 year old), its links with health state and physical fitness. Methods of the research: identification size and intensity of physical activity, modified Eurofit tests, health state, pedagogical experiment, questionnaire completed by children, their parents and tutors, mathematical statistics. 127 4-5-year-old children participated in the research. The pedagogical experiment was organized in Klaipeda kindergarten. It was found that physical activity of children accounted for only 24 % of their daily wakeful time. Average number of motions performed each day by 5- year-old children was about 16 thousand: girls – about 13 thousand, boys – about 18 thousand. After comparison of children's morbidity with the data about physical activity, we noticed that the more frequently they were ill, the lower their physical activity was. Analysis of data showed that some 6-year-old children experienced different neurotic troubles. Least complaining about neurotic problems were physically active children. Conclusion: Children's physical activity and health are closely interrelated.

***Key words:** physical activity, physical fitness, health*