

# PHYSICAL ACTIVITY OF CHILDREN IN PRE-SCHOOL AGE IN THE OPINION OF PARENTS AND TEACHERS FROM KINDERGARTENS IN UKRAINE

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**Abstract.** Bearing in mind the proper development of a young person, attention should be paid to shaping certain habits related to physical activity during childhood. The child's physical activity influences various parameters of his health, both today and in the future. In connection with the implementation of joint research between partner universities: Lesya Ukrainka Eastern European National University and Pope John Paul II State School of Higher Education in Biala Podlaska, Poland there was examined the level of physical activity of children aged 5-6 within one day including factors such as: age, sex, participation in sections in kindergarten and their leisure time. 250 children from kindergartens in Lutsk took part in the research. The research results showed that the majority of children show low activity, which may adversely affect their health. Therefore, there is a necessity to organize various kinds of physical activity classes for children, both in the family and in kindergarten.  
**Keywords:** child, daily energy consumption, level of physical activity, pre-school age.

## Introduction

Physical activity and proper eating habits have a very big influence on the health of society, and especially on the psychophysical condition of the youngest part of it, that is children. Adult life habits and attitudes presented by a man depend to a large extent on education in his/her childhood, in which a child learns, gets to know the system of values and shapes his personality. Researchers have shown that about 50 % of learning abilities develop up to the

fourth year of life and a further 30 % before the age of eight. In these years, the main nerve pathways are created, enabling lifelong learning. They will continue to form, but their foundations are formed during the mentioned period. Children, through regular exercise, greatly support brain development. This is because the so-called vestibular system is stimulated (Osiński, 2011; Janssen, 2007; Bruunsgaard, 2005). We recognize the importance of movement in the therapy of many developmental disorders and diseases, in the fight process among others against obesity, movement disorders, prevention of osteoporosis, treatment of cerebral palsy, etc. (Bielski, 2005; Bruunsgaard, 2005; Woynarowska et al., 2010).

Current research results show an increasing trend of limiting physical effort to mental effort and a static lifestyle (Merkel et al., 2011; Wasilewska & Bergier, 2015). There are many attempts to determine the desired level of physical activity, but due to interpersonal differences, it is difficult. It is assumed that the optimal dose of physical activity in children and adolescents is one that satisfies motor needs and stimulates body development. These needs are, as mentioned, different. Another is also the optimum needed to maintain health and other to improve it. Therefore, an important element in the voluntary undertaking of an activity is that its level is optimal for every human being (Barankiewicz, 1998; Cendrowski, 2002).

Some countries apply guidelines for the physical activity of children aged 3-6, developed by the National Association for Sport and Physical Education in the USA (Naspe, 2009). It is recommended for children of the above-mentioned age to have at least 120 minutes of physical activity at an average level (Vale et al., 2012).

In Canada, experts have developed guidelines for physical activity for children but from the age of 6. It is recommended for children of this age to have during the day at least 60 minutes of physical activity in a structural form, i.e. the planned one and several hours of natural activity. The child should not be in a sedentary mode during the day, but only less than 60 minutes. Gradually, children should be introduced to more complicated physical activities related to the development and strengthening of muscles. The guidelines included in the mentioned document also apply to teachers, i.e. people responsible for the safety of pre-schoolers, especially those related to substantive preparation as well as awareness of the importance of physical activity in child development (Timmons et al., 2007).

In Poland and in Ukraine, the choice of methods of working with children in kindergarten and the conditions for their implementation are decided by the teacher. This also applies to classes on physical activity. Therefore, the effectiveness of this type of activity depends on the teacher, his/her competences, commitment, creativity and personal predisposition.

Bearing in mind the concern for the proper development of the child and its needs in the field of physical activity and the lack of current publications on the publishing market on this issue, it should be noted that there is a need to conduct research on the diagnosis of physical activity among pre-school children. The research was carried out thanks to scientific cooperation between John Paul II State School of Higher Education in Biała Podlaska and Lesya Ukrainka Eastern European National University in Lutsk.

Since 2010, many different changes in the education system have been observed in Ukraine, including pre-school education, which is now an integral part of it. The state ensures the availability of kindergartens to all citizens. This approach of the state to the dissemination of pre-school education undoubtedly had an impact on increasing the percentage of children's participation in pre-school education. In 2016, about 80 % of children aged 3-5 attended kindergartens, and children aged 5-6 (7) to 90 %. Considering the fact that such a high percentage of children are covered by pre-school education, it should be stated that most of the day they spend in kindergarten, learn, develop their interests in sports, art, dance, music and so-called "additional" activities. However, only some children take advantage of the extensive offer of additional activities, because they are paid by parents.

The main objective of the research was to indentify the level of physical activity of children aged 5-6, who attend kindergartens in Lutsk. The more specific objectives of the study were to:

1. to determine energy consumption by children during the day,
2. to understand the level of physical activity of children, including sex and age and observing the differences.
3. to examine the statistical correlation between the level of physical activity of children and participation in sports, dance, outdoor walks or watching TV.

### **The methodology of the research**

The research was carried out in October 2017 in 15 randomly selected municipal kindergartens in Lutsk. A total of 250 children (50 % girls and 50 % boys) were examined, thanks to the help of their parents and teachers. The conducted research was objective because the measurements were made using a modified version of the International Physical Activity Questionnaire (IPAQ) adapted to the age of children (Biernat, 2007). It has been approved by the Ministry of Health and Hygiene of Ukraine and is used to assess the physical activity of pre-school children. In the description of the methodology for the use of the said tool, the recommendations of countries in which it can be used are listed, among them Ukraine and Poland have been listed (Recommendation of

the Ministry of Health of Ukraine, 169.11/39.2012). At this point, attention should be paid to the units used to measure energy consumption, used in each version of the IPAQ questionnaire, they are so-called metabolic equivalents of energy consumption, called “MET” for short. They have different values depending on the type of physical activity being performed. They allow using the acquired information on the durability of various (as to intensity) types of activity to determine the energy consumption of children and to assess their level of physical activity. After reading energy consumption “value” of particular types of physical activity, one of the five levels of physical activity that are presented in Table 1 is determined.

**Table 1 Classification of activity types in terms of energy consumption and intensity of physical activity**

<b>Intensity of physical activity</b>	<b>Energy consumption „MET” factor</b>	<b>Types of activity</b>
Minimal	0,9	Sleep, rest in a lying position.
Very low	1,3	Travelling by public means of communication, meal, reading, painting, watching TV, working at the computer, music classes, handicrafts, board games, resting in a standing position.
Low	2,6	Personal hygiene, pre-school activities, walking at a slow pace, cycling at a slow pace.
Average	4,0	Walking at a fast pace, walks, movement games, morning gymnastics, farm work, fast cycling.
High	6,0	Running, dancing, swimming, skiing, tennis, football, sport activities with a significant physical load.

*Source: Ministry of Health of Ukraine (2012). Оцінка добових енерговитрат для визначення рівня рухової активності дітей старшого дошкільного віку [Текст]: Методичні рекомендації (169.11/39.12). Мін. охорони здоров'я України, Нац. акад. мед. наук України, Укр. центрнаук.мед. інформації та патентно-ліцензійної роботи; [укл. Н. С. Полька [та ін.] - Київ: [б.в.], 2012.-16.*

### **Data analysis**

The analysis of the research results was primarily based on the inclusion in the IPAQ questionnaire (modified version for children) of the duration of the various activities that the child performs during the day, counted in minutes. Some information was obtained directly from parents, and some from teachers from kindergartens. This data has been written by teachers who know children well because they have classes with them. Based on the duration (in minutes) of each recorded activity performed by the child and multiplied by the corresponding MET value (read from the reference table of this method), the

real energy consumption of the examined child was obtained within 24 hours. In the second stage of data analysis, the arithmetic means of energy consumption values per day were calculated, taking into account the age of children and their sex. The correlation of indicators of general physical activity and individual types of child's activity were also counted, e.g. participation in sections in kindergarten, watching TV, during a walk, and others.

### **The results of the research**

As a result of the research conducted by five and six-year-old pre-schoolers, it was found that the total energy expenditure of children was 2044.41 "MET" contract units, with the ratio ranging from 1400.50 to 2874.60. The aforementioned value of the physical activity indicator corresponds to the level of activity "below average". This level of physical activity is characterized by the limitation of the number and intensity of movements, which is conditioned by the lifestyle, irrational hygiene of the organization of the didactic and educational process in educational institutions, limiting the choice of physical education, lack of free time. Children with such a level of physical activity constitute a risk group of possible negative impact of hypokinesia on physical development and functional capabilities of the organism, formation of cardiovascular, endocrine and osteochondral disorders. Table 2 presents average energy consumption indicators per day by the examined children, taking into account their sex and age.

**Table 2 Average energy consumption indicators during the day**

<b>No.</b>	<b>The age and sex of the children</b>	<b>Average energy consumption indicators during the day</b>	<b>Average energy consumption indicators during the day</b>
1.	5-year- old girls	2087.35	2038.47
2.	6-year-old girls	1989.59	
3.	5-year-old boys	2021.00	2050.35
4.	6-year-old boys	2079.69	
	Total	2044.41	2044.41

The division of children into groups as to their sex and age allowed for the detection of differences in overall energy consumption. The highest energy consumption was recorded in the group of 5-year-old girls, and the lowest in girls, but older, i.e. at the age of 6. The average values of energy consumption in "MET" units (tab. 2) by children during the day, taking into account their sex and age, show that the physical activity of the examined children is not at the same level.

Based on the results of the tests, the following levels of physical activity were determined: high, above-average, average, below-average and low. Table 3 presents the percentage structure of children, including their sex, depending on the level of physical activity.

**Table 3 The level of physical activity of the examined children**

<b>Lp.</b>	<b>The level of physical activity</b>	<b>Girls</b>	<b>Boys</b>	<b>Total</b>
1.	High level	1%	1%	2%
2.	Above-average level	2%	2%	4%
3.	Average level	19 %	17%	36%
4.	Below- average level	15%	14%	29%
5.	Low level	15%	14%	29%
	Total	52%	48%	100%

Percentage indicators show that 36 % of children had physical activity at the average level. Unfortunately, these are not optimal data. As many as 29 % of children showed a level below the average and 29 % low level. From the point of view of child development and psychophysical regularities, activity at the average level is the most beneficial. Recommendations on physical health in relation to different age groups are set out in the Global Recommendations on Physical Activity for Health. A recommendation was made for children aged 5-9: “All children regardless of their sex, race, ethnicity and income level should be physically active every day as a part of play, games, sport, recreation in the context of school, kindergarten and family (WHO, 2010, p. 16-19) During the day the child should have a minimum physical activity of 60 minutes at the average level. Health benefits are provided above this activity. In addition, high intensity is recommended at least 3 times per week to strengthen muscles and bones (WHO, 2010). Therefore, a high percentage of children who did not show physical activity at the average level (over 60 %) is worrying. In such situations, the body is unable to utilize the calories it is provided with and to convert them into adipose tissue, and this leads to obesity.

Children in kindergarten participate in various sections, research results have shown that 26 % of children from all respondents take part in dance and sports sections. The level of activity of children exercising in the sections is presented in table 4. Percentage indicators show that 9 % of the examined children have physical activity above the average level, 66 % - average level, 13 % - below the average and 12 % - low level of physical activity.

Table 4 The level of physical activity of children exercising in sections

Lp.	The level of physical activity	Total
1.	High level	9%
2.	Above- average level	13%
3.	Average level	66%
4.	Below- average level	12%
	Total	100%

As it can be seen in Table 4, the level of physical activity of children exercising in sections is much better compared to the data in Table 3. It should be interpreted that in these children the range of optimal energy consumption for daily physical activity secures the normal development of physical and mental properties, the elevated level of functional capabilities of the body, preservation and strengthening of health. At this point it should be indicated that the mentioned activity was found only in those children who take advantage of activities in sections (26 %) and the remaining children, it is 74 %, do not take part in such activities. The factor limiting the availability of this type of classes is high costs.

Energy consumption was also measured during walks and watching television programs as well as when playing computer games. The largest energy expenditure was observed in children during walks. As it turned out, the reduction in the overall level of physical activity decreases at a time when children are watching TV programs or when they are engaged in computer games. This is associated with a gradual decrease in energy expenditure. Figure 1 presents average rates of energy consumption by children during the above-mentioned activities, taking into account the levels of physical activity.

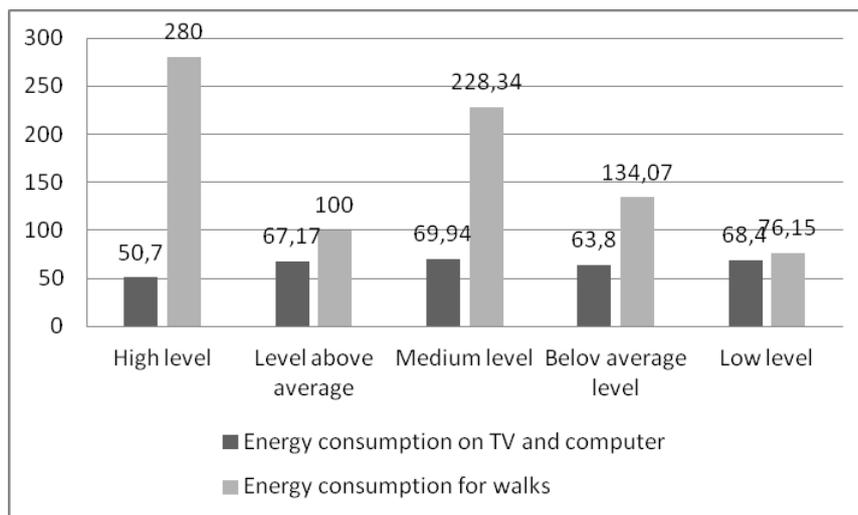


Fig. 1. Energy consumption indicators for walking, TV and computer games

In order to determine the relationship between the general level of physical activity and individual activities, a correlation data analysis was carried out. Direct correlation was determined using the Pearson test ( $p \leq 0.01$ ) between classes in sections, outdoor walks and general level of physical activity. The analysis of the data showed that there are statistically significant relationships between the mentioned variables. However, between the time of watching TV programs, playing on a computer and the level of physical activity, no correlation relationships were found.

## **Discussion**

The aim of the research was to determine the level of physical activity of children aged 5-6 who attend kindergartens in Lutsk, Ukraine. The research was carried out using the IPAQ tool adapted to pre-school children and recommended by the Ministry of Health of Ukraine. In general, the level of physical activity of the studied population was recorded below the average, in both girls and boys. European research on the level of physical activity should include research conducted in Denmark, Portugal and Poland depending on the age of children, their sex and even kindergarten. In these countries, research has shown a varied level of physical activity of pre-school children, even at the same calendar age. In Denmark, children's physical activity was examined using special devices called accelerometers. It was found that about 50 % of children aged 4-6 were active at the average level. The girls were less physically active compared to boys of the same age. Thus, the boys were more active (Pate et al., 2006).

In Portugal, in Porto children's activity was also tested using accelerometers and included children aged 4-6 during their stay in kindergarten for 7 consecutive days. The relationship between physical activity and childhood obesity was examined. The results of these studies have shown that boys are more active than girls and less obese (Vale et al., 2013).

In Poland, research on the physical activity of pre-schoolers aged 4-6 was conducted in 2017, similarly to Ukraine using the IPAQ tool. The results showed that about 50 % of the examined children show physical activity below the average level, and some children (15 %) - low level. High activity level was not recorded. As mentioned earlier in the article, low level activity is particularly unfavourable for children in developmental age which is the preschool age (Waszczuk et al., 2017).

It is also necessary to pay attention to the results of Swedish studies of 4-year-old children. It was a comparative study of physical activity of children within 5 days in kindergarten with activity at home during two weekend days. It turns out that the activity of children during the weekend is lower compared to

the activity in kindergarten during 5 days. At home, most children spend their free time with family in a passive way (Berglind & Tynelius, 2018).

Authors of the cited studies from these countries draw attention to the need to continue research on physical activity of children in the context of various factors, age and sex are important, but the family environment, playground activity, growth and weight indicators should be investigated. The research forecasts presented will certainly be implemented for children's health.

### Conclusions

The results of the study showed that the level of physical activity of the studied population of children aged 5-6 attending kindergartens in Lutsk is below the average. This level is unsatisfactory and may adversely affect their health in the future. There were significant differences in the level of physical activity of children depending on their age and sex. Definitely better results were observed in girls compared to boys, both in the age group of 5 and 6 years.

Therefore, it is proposed that kindergartens take part in the research project taking action to modify the existing work in the field of development of children's physical activity. These can be the ones that diversify activities in a physical form, more outdoor activities, and extending their duration. At the same time each kindergarten will adapt the conclusions presented to them according to their own capabilities and specificity.

The analysis of the research results showed the second aspect that will require a correction. This applies to parents who should spend their free time with their children in an active way, not passive. After coming home from kindergarten, children usually spend their time in front of the TV and computer, which may lead to the persistence of negative patterns in the future.

Results in the level of physical activity above the average and at the average level were noted only in 26 % of children taking part in sports and dance sections. It is therefore worthwhile to propose that kindergartens organize and diversify sections to increase the participation of children in them. Therefore, undertaking joint activities of kindergartens with parents will be a good prognosis in the area of developing physical activity of children. Bearing in mind the presented problems of physical activity of pre-school children, it should be noted that it will be the subject of further research.

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