Associations between physical activity of primary school first-graders during leisure time and family socioeconomic status

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Key words: *first-graders; physical activity during leisure time; family socioeconomic status.*

Summary. *In 2008, an international survey on obesity among first-graders and its risk factors was performed in Lithuania. The objective of this study was to assess physical activity of first-graders during leisure time according to family socioeconomic status. The study was performed in Šiauliai region schools selected randomly in 2008. The anonymous questionnaires were distributed among 630 first-graders and filled out by 515 parents (response rate was 81.8%). It was showed that physical activity of first-graders during leisure time is insufficient. More than half of them (60.4%) did not attend sports or dancing clubs; children spent much time passively watching TV or playing on a computer. Mostly children watched TV for 2 hours on workdays (45.1%) and for 3 hours or more on weekends (41.4%). Mostly children spent about an hour per day playing on a computer: one-third of first-graders spent it on workdays; during weekends, the percentage of children spending about an hour per day playing on a computer was lower (28.5%). One-third of first-graders (36.9%) spent their leisure time outside for 3 or more hours on workdays and 87.1% on weekends independently of parents' educational level, income, and place of residence.*

The associations between family socioeconomic status and physical activity of children were observed. The lowest percentage of children attending sports or dancing clubs and playing computer games was seen in low-income families and families where parents had low educational level. They spent more time outside (on workdays) compared with those children whose parents had university education and high income. Fewer first-graders from families living in villages than those living in cities attended sports or dancing clubs and played on a computer, but more of them spent leisure time outside.

Introduction

The habits of physical activity are formed in childhood and usually persist all over the life span. When a child begins to attend school, level of his/her physical activity decreases, and child's activities change from play to work (1). Physical activity as one of the main forms of leisure time of schoolchildren is the warranty of good health, social and emotional welfare. Even a short-term everyday physical activity lowers the chance of gaining overweight, improves metabolism, heart work, effects general well-being positively (2). Scientists from various countries established that schoolchildren must be physically active not less than 8–10 hours per week. The surveys of physical activity and its impact on physical health show that optimal norm of everyday physical activity for preschoolers and elementary school graders is 3–4 hours (3).

Parents of first-graders plan leisure time of their children; they decide if children attend sports club or play with friends in the yard. Vilūnienė and Jankauskienė analyzed the attitude of parents with different physical activity toward physical self-help and physical training of their children and established the correlation between the attitude and physical activity of children – children of physically active parents are also more physically active (4). According to the majority of international studies on lifestyle, the physical activity of Lithuanians and inhabitants from other Baltic countries is low. In comparison with Latvia and Estonia, inhabitants of Lithuania tend to more passive rest. More than 60% of Lithuanian population (43% of Estonians and 52% of Latvians, respectively) gives priority to passive recreation (5). A matter of particularly great concern is the fact that insufficient physical activity is spreading rapidly among school-

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children (6). The survey on lifestyle of families growing preschool-aged children shows that their physical activity is insufficient: half of the parents never exercised, about half of preschoolers never did exercises (41.4%), or did exercises rarely (12.5%) (7).

The problem of physical activity among children should be solved by the family and by the school. The main physical education form in schools is class of physical education (8). The Association of Lithuanian Physical Training Teachers in 2005 performed a study of physical activity among Lithuanian schoolchildren. According to the data, physical activity of 85.5% Lithuanian schoolchildren is insufficient (9). They watch TV too long and spend too much time playing with computer. The survey of additional education carried out by the Department of Education in Šiauliai showed that children attending elementary schools are involved in activities of children and youth organizations (scouts, maironiečiai, ateitininkai, and others; 14.2%) and attend intellectual education (mostly English language) sessions (29.4%). Although schoolchildren are interested in active physical activities (sports, dances), the intellectual activities such as foreign and Lithuanian languages, computer literacy, and mathematics are more important for their parents (10).

Social status, income, and educational level are the factors that determinate physical activity. The influence of parents on physical activity of their children is associated with their social status and education (11, 12). Consequently, the impact of parents from various social and educational levels is different educating children's attitude toward physical activity and forming their behavior. It is thought that more physically active children are growing in families with university education (13). While analyzing the correlation between physical activity of schoolchildren and family socioeconomic status, the attention is paid to sports and physical activity during leisure time. Šukys and Bagdonas (14) point out that higher socioeconomic status of family is not a factor that stimulates physical activity of schoolchildren. According to their data, schoolchildren from families where parents did not have university education or are unemployed are more involved in physical activity. This is because of the possibility to attend some sport clubs for free (i.e. football for boys and aerobics for girls). If family income is lower, it might be one of the alternatives for children to improve their skills in the activity they like and to spend their leisure time actively. Children from families with higher income can choose more various forms spending their leisure time. Other authors state that in families where parents have university education and higher income, children are more physically active during their leisure time (15). However, these links manifest diversely in different age groups of schoolchildren, and first-graders have not been studied regarding this aspect at all. According to Šukys and Bagdonas, studies on associations between physical activity and parental socioeconomic status still remain actual, especially in Lithuania where there is a lack of such evaluation (14).

There is a paucity of studies analyzing the associations between physical activity and place of residence. Therefore, living conditions and habits in rural areas strongly differ comparing Lithuania and other countries. The survey on health behavior in school-aged children (11–15-year olds) showed that children from villages were engaged physical activity less than their peers living in cities (16).

The aim of this study was to assess physical activity of first-graders during leisure time according to socioeconomic status of their families.

Material and methods

A cross-sectional epidemiological survey was carried out in Šiauliai region schools in 2008. This international survey involving seventeen countries is coordinated by the World Health Organization (WHO). Its experts prepared the questionnaire, which was adapted for Lithuania. The questionnaire includes questions on physical activity of first-graders during leisure time: how children go to school and come from it; how far is the school from their homes; does a child attend any sport or dancing club; if does, how many times per week; how much time children spend playing outside on workdays and weekends, preparing their homework, playing computer games, watching TV, etc. The Ministry of Education and Science of Lithuania was informed about the survey and agreed with survey to be done. Lithuanian Bioethics Committee gave a permission to carry out the survey. The study was supported by the Science Fund of Kaunas University of Medicine and the Lithuanian State Science and Studies Foundation.

A total of 17 primary schools were randomly selected from the list of schools in Šiauliai region. The anonymous questionnaires were distributed among 630 first-graders (randomly selected) asking their parents to fill them out. The questionnaires were filled out by 515 persons (the response rate was 81.8%). Parents of 259 (50.3%) boys and 256 (49.7%) girls living in cities (71.1%) and villages (28.9%) were included into the study.

While analyzing the factors of physical activity

by socioeconomic status of the family, the parents were divided into groups: 1) by education level – low (incomplete secondary and secondary), vocational, and university (Bachelor's or Master's degree); 2) by income – low (less than 600 Lt for person per month), moderate (601–800 Lt), and high (more than 800 Lt).

Statistical analysis was performed using the statistical package SPSS 11 for Windows. For the comparison of proportions, chi-square (χ^2) criterion and *z* criterion were used. Differences between two proportions were regarded as significant when a *P* value was <0.05.

Results

About half (57%) of mothers and fathers of first-graders had low education, 22.7% had vocational, and the rest of the parents had university education. The educational level of mothers and fathers differed. More mothers than fathers had university education (28.3% and 16.5%, respectively; $P<0.001$) and more fathers (62.3%) than mothers (52.1%) had low level of education ($P<0.01$).

Income of half of families (53.1%) was low, 18.4%, moderate; and 28.5%, high. The income depended on educational level of parents: the higher was education, the higher was income ($P<0.05$). Families where mother or father had low education more frequently had low income (71.1% and 61.9%, respectively), and families where mother or father had university education had high income (55.9% and 60.0%). A significantly higher percentage of parents who had university education were living in cities as compared with villages (35.9% and 9.7% of mothers and 20.6% and 5.6% of fathers, respectively; $P<0.05$). The analysis of family income by place of residence revealed that the highest proportion of families in villages (70.4%) had low income (in towns, 46.4%).

The subjective physical activity of children was evaluated while analyzing parents answers to a question, "How physically active is your child?" One-fourth of parents reported that their child is very active (does a lot of sports, runs, plays, goes to sport or dancing club, helps in the farm), almost two-thirds (64.7%) described the child as sufficiently active, and the rest evaluated as not very active.

The data of the survey showed the tendencies in evaluation of physical activity of schoolchildren according to parental education. Fathers having university education gave the best assessment of physical activity of their children. There were twice as more fathers finding their child very active among fathers with higher education as compared to those with low level of education (Table 1).

Mothers evaluated physical activity of their children similarly: 31% of mothers with university education and 22.7% of mothers with low level of education found their child as very active ($P<0.05$).

Physical activity of children was evaluated also by analyzing the answers of parents about sports or dancing club attendance, time spent playing outside, playing with a computer, watching TV, etc. More than half of first-graders went to school and came back from it on foot (58.8% and 72.2%, respectively), and this is not related to their parents' education or income. Only 3.3 % and 7.8% of parents reported that their children went to and came back from it by public transport; 1.2% rode a bicycle. Every tenth child from village was taken to and back from school by school bus.

More than one-third (35.5%) of children were brought to school by car, and every fifth (20.8%) was taken home by car too. As mother's educational level increased, the number of children brought to and taken back from school by car increased too (Table 2).

The analogous data were obtained when analyzing the correlation between paternal education and the number of children brought to school by car: 33.9% of fathers with low levels of education and 46.7% with university education brought their children to school by car ($P<0.05$).

Table 1. **Fathers' evaluation of physical activity of first-graders in relation to fathers' education**

Education level	Evaluation of physical activity of first-graders					
	Very active		Rather active		Not very active	
	n	%	n	%	n	%
Low	69	24.4	191	67.5	23	8.1
Vocational	19	19.8	63	65.6	14	14.6
University	33	44	25	46.7	7	9.3

χ_c=17.919; *df*=4; *P*=0.001.

Table 2. **Number/percentage of first-graders going to school and coming back by car in relation to mother's education**

Education level	Going to school*		Coming from school**	
	n	%	n	%
Low	67	25.7	45	17.2
Vocational	30	30.6	16	16.3
University	80	56.3	43	30.3

*χ_c=39.043; *df*=2; *P*=0.000.
**χ_c=10.962; *df*=2; *P*=0.004.

As family income rose, the proportion of children brought to school by car also increased (31.1% in low-, 34.1% in moderate-, and 46.3% in-high income families; χ_c=9.076; *df*=2; *P*=0.011), but the proportion of children who took the school bus going to school (11%, 3.4%, and 2.9%, respectively; χ_c=10.960; *df*=2; *P*=0.04) and coming from (9.8%, 3.4%, and 2.2%, respectively; χ_c=10.2; *df*=2; *P*=0.006) was decreased. Thus, the biggest part of children from the families with low income got to and from school by school bus.

The results showed that 39.6% of first-graders were attending sports and dancing clubs. Three-fourths of them went to the clubs once (33.3%) or two days (43.1%) per week; 15.7%, three days a week; and others attended more frequently. Children of parents (mothers or fathers) with university education were attending clubs more frequently (52.8% and 59.5%, respectively) as compared with those parents with or lower or vocational education (37.9% and 38.6%, 41.5% and 39.4%, respectively). Sports or dancing clubs were attended more frequently in cities than in villages (45.5% and 35.4%, respectively; *P*<0.05).

Family income has a great influence on children's physical activity during their leisure time. The highest percentage of children attending sports or dancing clubs was in families with the highest income (52.2%). In families with low and moderate income, the proportion of first-graders attending clubs was significantly smaller (37.7% and 39.1%, respectively; χ_c=7.951; *df*=2, *P*=0.019).

According to our data, more than one-third (36.9%) of first-graders spent their leisure time outside 3 or more hours per day on workdays, while on weekends, the biggest proportion of children (87.1%) spent the same time independently of parental education, income, and place of residence. Half of schoolchildren (49.6%) of mothers with low level of education spent outside three hours or more on workdays, while children of mothers with vocational and university education usually spent outdoors two hours per day – 56.9% and 37.3%, respectively (χ_c=54.916; *df*=8; *P*=0.000). Similar results appeared while analyzing the educational level of fathers. Data of study showed that children from families with the lowest income played outside longer in comparison with children from families with higher income (Fig. 1).

Analogously, more children from villages spent their time (3 or more hours) playing outside as compared with children from cities (51.7% versus 30.9%, *P*<0.001).

It was shown that almost half (45.5%) of first-graders did their homework or read a book about 1 hour per day on workdays; one-fourth (27.2%) spent less than one hour and one-fifth (20.9%) two hours per day. During weekends, children spent less time doing homework or reading a book: 31% of first-graders did this about an hour and every-third – less than one hour. No associations between parental educational level, income, living location, and the time spent doing homework or reading a book were found.

The data about time spent watching TV showed that on workdays children mostly were watching TV about 2 hours (45.1%) and on weekends about 3 or more hours (41.4%). Every third first-grader (34%) on workdays and every seventh on weekends watched TV about one hour per day. There was a threefold decrease in the proportion of children who spent watching TV about 3 or more hours on workdays (13.5%) than on weekends.

Time spent watching TV on workdays was not associated with parents' educational level. On weekends, children of mothers with the lowest education spent the most time watching TV: 33.1% of children in families with low level of education, 38.1% of children in families with vocational and 46.9% with university education were watching TV 3 or more hours; about 2 hours – 32.9%, 45.4%, and 54%, respectively (χ_c=19.418; *df*=8; *P*=0.013). The time spent watching TV either on workdays or on weekends did not depend on family income (χ_c=7.927; df=8;

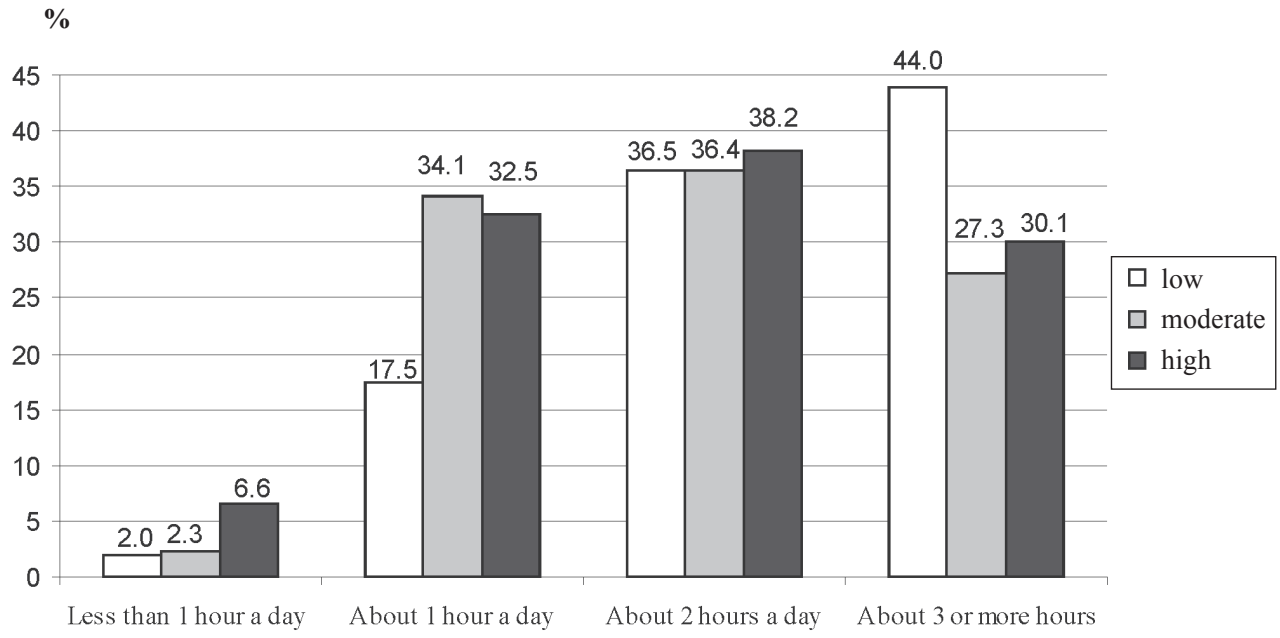

Fig. 1. **Distribution of time spent by first-graders playing outside on workdays by family income**

P=0.441).

First-graders spend their time passively not only watching TV but also playing computer games. Mostly children spent about an hour per day for this activity: one-third of first-graders spent it on workdays, and during weekends, this proportion was a little smaller (Fig. 2 and Fig. 3).

The higher the mother's education, the more time her children spent playing computer games during workdays and weekends. For example, one-third (34.3%) of children of mothers with low level of education and one-fifth (19.7%) of mothers with university education did not play computer games on workdays ($P<0.01$). On weekends the percentage of children not playing computer games is lower on families where mothers had university education: only every tenth (10.1%) child did not play on a computer on weekends. No associations between children who did not play computer games and father's educational level were observed. Our data showed that family income was of importance: the lower income, the higher proportion of children were not playing computer games. On workdays, 34.1%, 23%, and 18.4% of children from low-, moderate-, and high-income families, respectively, were not playing computer games (χ_c=20.020; *df*=8; *P*=0.010), and on weekends – 30.5%, 16.3% and 15.3%, respectively (χ_c=20.675; *df*=8; *P*=0.008). Looking for associations between place of residence and time spent playing on a computer, a significant difference was found while analyzing the time spent playing computer during weekends. In villages, there were fewer children playing computer games during weekends as compared with children from cities (17.8% and 36.6%, respectively; $P<0.001$).

Discussion

It is human nature for children to be active. Usually children move by playing, running in the room, outdoors, but parents suppress their physical activity by various prohibitions, requirements or orders to sit still and be quiet (8). After school entry, the everyday life of most children changes, and a new mode of life that lowers their physical activity is forming (13). Family and school remain institutions supporting and developing physical activity of children.

In 2005, Vilnius Public Health Center carried out a study in order to clarify the causes of physical inactivity among 6th-, 8th-, and 11th-graders. It appeared that for most children (60%), school and lessons of physical activity are the only places where they are physically active, and only 39.8% of schoolchildren attend sports clubs additionally (9). According to our data, the same percentage of children (39.6%) attended sports or dancing clubs. Volbekienė et al. carried out a survey in schools of the biggest cities in Lithuania (5th–11h grade) and concluded that everyday intensity, frequency, and duration of physical activities do not correspond with recommendations of WHO (17). WHO recommends developing physical activity strengthening the health, i.e. every day at least an hour to be engaged in physical activity of medium intensity.

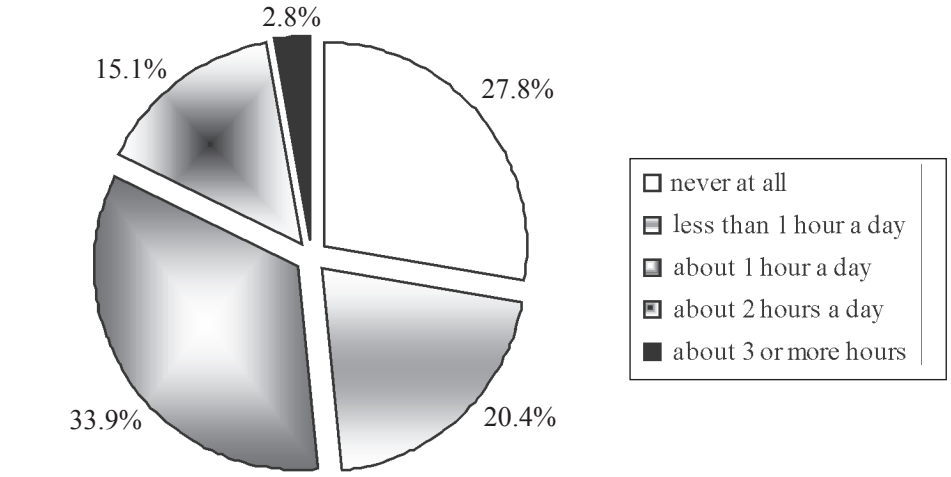

Fig. 2. **Distribution of time spent by first-graders playing computer games on workdays**

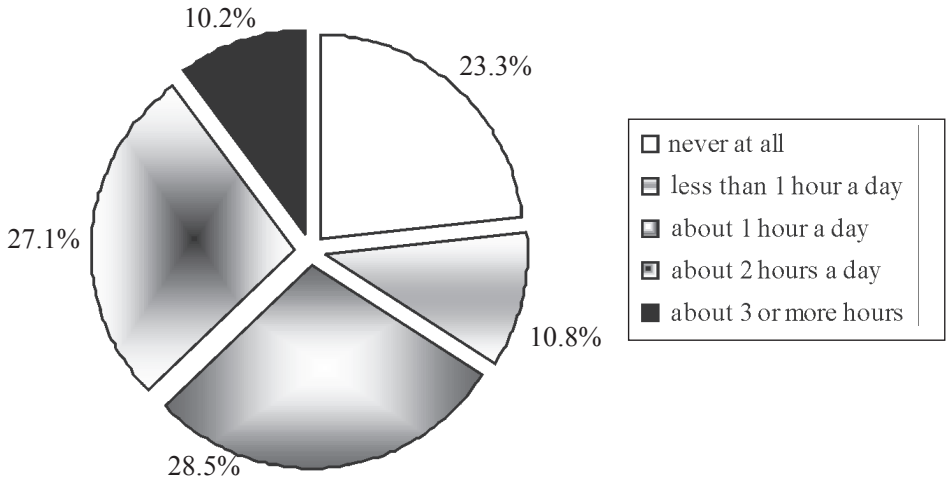

Fig. 3. **Distribution of time spent by first-graders playing computer games on weekends**

The study by Association of Lithuanian Physical Training Teachers showed that 85.8% of Lithuanian schoolchildren are insufficiently physically active (9). Our data showed that only 3% of first-graders attended sports or dancing clubs 4 or 5 times a week.

The survey on health behavior of school-aged children (5th-, 7th-, and 9th-grade) by Zaborskis and colleagues showed a significant correlation between physical activity of schoolchildren and their social integration as well as socioeconomic factors: children from low-income families exercised and went for sports less frequently than children from high-income families (18). However, according to the data of Šukys and Bagdonas, who studies 6th-, 8th-, and 11th-grade schoolchildren, socioeconomic status of families had little influence on schoolchildren's participation in sports (14). There were no significant associations between schoolchildren's participation in sports activities and their parents' education and living conditions. Our data indicated that the highest percentages of first-graders attending sports or dancing clubs were in families where parents had the highest educational level (university education) as well as in families with the highest income. It can be related to the fact that almost all sports or dancing clubs are paid. Furthermore, often parents themselves have to buy sport or dancing equipment, and parents with low income have no financial possibilities for this. Considering living place of families, Zaborskis et al. reported that 11-, 13-, and 15-year-old boys and girls from villages were exercising and participating in sports less than their peers in cities (16). Analogous situation was observed in our survey: fewer first-graders from villages were attending sports clubs as compared with their peers in cities. This is obvious because in cities there is a wider-range offer of physical activities, which is not

available for children in villages. Additionally, in villages there are more low-income families than in cities. However, we cannot affirm that schoolchildren from cities are more active than children from villages. While assessing physical activity of schoolchildren, it is essential to pay attention to the fact that living in villages takes more physical exertion (for example, helping in household or farming work) than in cities.

This study revealed that first-graders spent much time passively watching TV and playing on a computer. The health behavior survey of families having preschool-aged children showed that even two-fifths (39.7%) of children spent 1–2 hours playing on a computer and more than half of them (55.6%) watched TV 1 or 2 hours (19). According to our data, 49% and 79.1% of first-graders spent the same amounts of time playing on a computer spend and watching TV, respectively. Thus, first-graders spent more time passively as compared with preschool-aged children.

First-graders from families with higher income and families from cities spent more time playing computer games than in the families with lower income and living in villages. It might be that low-income families have no possibility to purchase a computer, and their children spend more leisure time playing outside. The same conclusions were made by Motl et al.: the less schoolchildren watch TV or play computer games, the more physically active in leisure time they are (20).

Sila, a researcher from Estonia, referring to experimental data, determined the norms of optimal physical activity for 7–18-year-old children. They must be physically active for 3–3.5 hours per day, and 15–40% of this time they should be in active movement (3). According to our data, almost one-third of first-graders were playing outside 3 or more hours per day, while on weekends, this number increased 2.5 times. Children from families with low income spent most of their time playing outside; similarly behaved children from villages.

Conclusions

1. Though the majority of parents evaluated their children as very active physically, physical activity of first-graders during leisure time was insufficient. More than half of them did not attend sports or dancing clubs; children spent much time passively watching TV or playing on a computer. One-third of children spent leisure time playing outside about 3 or more hours on workdays.

2. The associations between family socioeconomic status and first-graders' physical activity were observed. The lowest percentage of children attending sports or dancing clubs and playing computer games was seen in low-income families and families where parents had low educational level. However, they spent more time playing outside as compared with those whose parents had university education and higher income.

3. Fewer first-graders from families living in villages than those living in cities attended sports or dancing clubs and played on a computer, but more of them spent leisure time outside.

Pirmųjų klasių moksleivių fizinio aktyvumo laisvalaikiu bei šeimos socialinės ir materialinės padėties sąsajos

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Santrauka. 2008 m. Lietuvoje atliktas tarptautinis pirmųjų klasių moksleivių nutukimo ir jo rizikos veiksnių tyrimas. *Tyrimo tikslas*. Įvertinti pirmųjų klasių moksleivių fizinio aktyvumo laisvalaikiu savitumus, atsižvelgiant į šeimų socialinę ir ekonominę padėtį. Atsitiktinai atrinktose Šiaulių apskrities mokyklose 630 pirmųjų klasių moksleivių išdalytos anketos (anketas užpildė tėvai). Anketas grąžino 515 žmonių (atsako dažnis – 81,8 proc.). Nustatyta, kad pirmųjų klasių moksleivių fizinis aktyvumas laisvalaikiu nepakankamas. Daugiau kaip pusė vaikų (60,4 proc.) nelanko nei sporto, nei šokių būrelių, pirmųjų klasių moksleiviai daug laiko praleidžia pasyviai žiūrėdami televizorių ar žaisdami kompiuteriu. Darbo dienomis vaikai dažniausiai žiūrėjo televizorių apie 2 valandas (45,1 proc.), savaitgaliais – apie 3 valandas ir daugiau (41,4 proc.). Prie kompiuterio dažniausiai praleidžia apie 1 valandą per dieną: darbo dienomis tiek laiko žaidžia trečdalis pirmųjų klasių moksleivių, savaitgaliais jų dalis šiek tiek mažesnė (28,5 proc.). Tyrimo duomenimis, darbo dienomis laisvalaikiu beveik

trečdalis (36,9 proc.) pirmųjų klasių moksleivių lauke žaidžia apie 3 val. ir daugiau per dieną, tuo tarpu savaitgaliais didžioji dalis vaikų (87,1 proc.) žaidžia lauke 3 val. ir daugiau, nepriklausomai nuo tėvų išsilavinimo, pajamų ir gyvenamosios vietos. Šeimos socialinė ir ekonominė padėtis turi įtakos pirmųjų klasių moksleivių sportavimui ir jų fiziniam aktyvumui laisvalaikiu. Mažo tėvų išsilavinimo ir mažų pajamų šeimose buvo daugiausia vaikų, nelankiusių sporto ar šokių būrelių, mažiausiai – žaidžiančių kompiuterinius žaidimus bei daugiau laiko praleidžiančių lauke (darbo dienomis) nei aukštąjį išsilavinimą ir dideles pajamas turinčių tėvų. Kaimo pirmųjų klasių moksleiviai laisvalaikiu mažiau sportavo, bet ir mažiau žaisdavo kompiuteriu nei gyvenantys mieste pirmųjų klasių moksleiviai, tačiau daugiau laiko darbo dienomis praleisdavo lauke.

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