AGREEMENT BETWEEN PARENTS’ PROXY REPORTS AND CHILDREN’S SELF-REPORTS OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR IN CHILDREN AGED 7 – 10 YEARS IN VOJVODINA

POVEZANOST PODATAKA O FIZIČKIM I SEDENTARNIM AKTIVNOSTIMA DECE DOBIJENIH OD DECE UZRASTA OD 7 DO 10 GODINA I NJIHOVIH RODITELJA U VOJVODINI

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Summary

Introduction. The aim of this study was to determine the agreement between parents’ and children’s reports of children’s physical activity and screen-based sedentary activities. Material and Methods. The sample included 7 - 10 year-old children (n = 94) and their parents (n = 94) in a local community in Vojvodina. Parents and children separately completed questionnaires about the types of physical and sedentary activities and the time children spent in different activities during one day. The agreement between children’s and parents’ responses was calculated using Cohen’s kappa. The differences in parents’ and children’s responses in relation to gender and grade the students attended were analyzed using χ² test. P-values less than 0.05 were considered statistically significant. Results. The highest level of agreement (κ = 0.74; p = 0.00) was found for the questions concerning physical activity in the morning before going to school. The lowest level of agreement was found for watching TV in the morning before going to school (κ = 0.21; p = 0.04). Children reported spending more time in screen-based sedentary activities than their parents. Conclusion. This research showed that there are differences in reports of children’s physical activities and screen time obtained from children aged 7 to 10 years and their parents. The lowest level of agreement was found for watching television, indicating low level of awareness and control of this screen-based sedentary behavior.

Key words: Sedentary Behavior; Screen Time; Exercise; Self Reports; Parents; Child; Surveys and Questionnaires

Sažetak

Uvod. Cilj rada je da se utvrdi povezanost podataka o fizičkim i sedentarnim aktivnostima dece dobijenih od dece uzrasta od 7 do 10 godina i njihovih roditelja. Materijal i metode. Uzorak je između dece uzrasta od 7 do 10 godina (n = 94) i njihove roditelje (n = 94) iz jedne lokalne zajednice u Vojvodini. Deca i roditelji su odvojeno popunjavali upitnik o vrsti fizičkih i sedentarnih aktivnosti i vremenu koje su deca provela u navedenim aktivnostima tokom jednog dana. Slaganje odgovora dece i roditelja analizirano je primenom Cohenove kapa metode. Razlike u slaganju odgovora roditelja i dece u odnosu na razred koje deca poštuju utvrđene su statistički značajnim. Rezultati. Najviši nivo slaganja odgovora roditelja i dece (κ = 0.74; p = 0.00) utvrđen je za pitanja koja su se odnosila na upražnjavanje fizičkih aktivnosti i vremenu koje deca provela u navedenim aktivnostima tokom jednog dana. Deca i roditelji su odvojeno popunjavali upitnik o vrsti fizičkih i sedentarnih aktivnosti i vremenu koje su deca provela u navedenim aktivnostima tokom jednog dana. Slaganje odgovora dece i roditelja, utvrđeno je primenom Koenove kapa metode. Razlike u slaganju odgovora dece i roditelja utvrđene su statistički značajnim. Rezultati. Najviši nivo slaganja odgovora dece i roditelja, utvrđen je primenom Koenove kapa metode. Razlike u slaganju odgovora dece i roditelja, utvrđene su statistički značajnim.

Ključne reči: Sedentarno ponašanje; vreme provedeno ispred ekrana; fizička aktivnost; odgovori; roditelji; deca; istraživanja i upitnici

Introduction

Accurate assessment of children’s physical activity and sedentary behavior is a challenging research topic. Numerous parameters and variability of physical activity in children make it difficult for monitoring [1]. Children are engaged in different activities during the day. Their activity pattern during unstructured spontaneous play is characterized by short intervals of intense physical activities combined with different intervals of low and moderate physical activity [1]. When children start going to school, their activity patterns change significantly [2]. Different methods and instruments have been developed for the assessment of physical activity and sedentary behavior in children. Considering strengths and limitations of each method, the choice of the most suitable method for a particular study depends on the research topic, target population, costs, etc [3]. Objective methods for the assessment of children’s physical activity include accelerometry, pedometry, heart rate monitoring, doubly-labeled water, and direct

Materijal i metode

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Ključne reči: Sedentarno ponašanje; vreme provedeno ispred ekrana; fizička aktivnost; odgovori; roditelji; deca; istraživanja i upitnici

Original study

Originalni naučni rad

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The aim of this study was to determine the level of agreement between parents’ reports of their children’s physical and sedentary activities and children’s self-reports of physical and sedentary activities.

The questionnaire consisted of two sets of questions ‘My activities for one day’ developed for this study. In order to overcome recall bias while reporting their physical and sedentary activities, children were asked to report activities they performed, devices they used and the time they spent performing them. The questionnaire included time spent using sedentary devices while being sedentary.

The study was performed as a part of the doctoral dissertation which was approved by Ethics Committee of the Faculty of Medicine, University of Novi Sad.

According to World Health Organization (WHO), physical activity is defined as “any bodily movement produced by skeletal muscles that requires energy expenditure” [13]. Physical activity includes exercise, but also other bodily movements which involve playing, working, travelling etc. [13]. Children's physical activity measured in this study included physical activities performed as a part of spontaneous outdoor play and organized sports activities. Sedentary behavior included behaviors practiced while awake in sitting, reclining or lying posture with required energy expenditure less than 1.5 metabolic equivalents (METs) [14]. Screen time measured in this study referred to sedentary screen time which included time spent using screen-based devices while being sedentary [14].

Data about children’s physical activity and screen time were collected using a questionnaire “My activities for one day” developed for this study. The questionnaire consisted of two sets of questions that were presented as pictures of different physical activities (playing outdoors, different sports activities, riding a bicycle) and screen-based devices (TV, computer, telephone). Children were asked to report activities they performed, devices they used and the time (only third and fourth grade children) spent in performing certain activities or using screen-based devices during one day. To boost children’s recall questions were organized in parts of the day (in the morning and in the noon - before going to school;
in the afternoon and in the evening - after school). Data were collected during one school day which started at 2 p.m. and finished at 5:35 or 6:25 p.m. Physical activities performed at school were not analyzed in this study.

The questionnaire for parents included the same questions as the questionnaire for children, without pictures. Parents were asked to specify physical activities their children were involved in, screen-based devices they used and the time spent in different activities or using screen-based devices during one day. Parents and children completed questionnaires separately for the same day.

The body mass index (BMI) was calculated based on children's height and weight reported by parents. Instruction letters for measuring children's body height and weight were created according to the guide for anthropometric measurements of the United States Centers for Disease Control and Prevention and sent to parents prior to obtaining data [15]. The participants were categorized into three groups based on BMI and age: normal weight (n = 51; 53.2%), overweight and obese (n = 26; 26.6%), and underweight (n = 3; 3.2%) [16]. A total of 14 parents (13.8%) did not report their children's height and weight.

Statistical Package for the Social Sciences version 18.0 (SPSS Inc., New York) was used for statistical analysis of the data. Parents’ and children's responses to certain questions were categorized into the following groups: physical activities before school, using screen-based devices before school, physical activities after school, using screen-based devices after school. Answers about the time spent in physical activities and screen-based time were also categorized in groups based on the part of the day. The level of agreement between parents’ reports and children’s self-reports was calculated with weighted kappa [16]. The difference in parents’ reports and children’s self-reports were analyzed using \( \chi^2 \) test in relation to children’s gender and grade. P-values less than 0.05 were considered statistically significant.

### Results

Parents' and children’s responses to certain questions, the agreement between children's self-reports and parents’ reports of physical activities and using screen-based devices are presented in Table 2.

Most children and parents agreed that children were using computers before school (91.5%) and after school (93.6%). The lowest percentage of children and parents agreed that children were watching TV in the morning (71.2%) (Table 3).

The \( \chi^2 \) test revealed significant differences between parents' reports and children's self-reports of physical activities and screen-based sedentary behavior in regard to the grade children attended. Significantly more first grade children and their parents (69.2%) (\( \chi^2 = 4.19; p = 0.00 \)) reported physical activity in the morning than children from third (24.0%) and fourth grades (19.4%). Watching TV in the morning was reported significantly more often by second grade children and their parents (80%) (\( \chi^2 = 12.29; p = 0.00 \)) than children and parents from first (23.1%), third (56%) and fourth grades (69.4%). Children from the first grade (46.2%) were significantly more likely to disagree with parents about watching TV at noon (\( \chi^2 = 16.28; p = 0.00 \)) than children from the second (15%), third (8%), and fourth grades (2.8%). Most first grade children and their parents disagreed about watching television (46.2%) (\( \chi^2 = 19.32; p = 0.00 \)) in the afternoon and playing computer games at noon (15.4%), (\( \chi^2 = 15.48; p = 0.02 \)).

Significantly more girls (60.9%) than boys (39.1%) agreed with their parents about the time spent playing computer games in the afternoon (\( \chi^2 = 11.23; p = 0.01 \)). Girls (59.5%) were also more likely to agree with their parents about the time

<table>
<thead>
<tr>
<th>Activities</th>
<th>Reported by parents</th>
<th>Reported by children</th>
<th>Responses agreed</th>
<th>Responses disagreed</th>
<th>Weighted kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prijavili roditelji</td>
<td>Prijavila deca</td>
<td>Odgovori se slažu</td>
<td>Odgovori se ne slažu</td>
<td>kapa</td>
</tr>
<tr>
<td>Watching TV in the morning and noon</td>
<td>74.5 (70)</td>
<td>77.7 (73)</td>
<td>71.2 (67)</td>
<td>28.7 (27)</td>
<td>0.21 (0.04)</td>
</tr>
<tr>
<td>Playing computer games in the morning and noon</td>
<td>8.5 (8)</td>
<td>10.6 (10)</td>
<td>91.5 (86)</td>
<td>8.5 (8)</td>
<td>0.59 (0.00)</td>
</tr>
<tr>
<td>Physical activities in the morning and noon</td>
<td>44.7 (42)</td>
<td>42.6 (40)</td>
<td>87.2 (82)</td>
<td>12.7 (12)</td>
<td>0.74 (0.00)</td>
</tr>
<tr>
<td>Watching TV in the afternoon and evening</td>
<td>69.1 (65)</td>
<td>62.8 (59)</td>
<td>73.4 (69)</td>
<td>26.6 (25)</td>
<td>0.39 (0.00)</td>
</tr>
<tr>
<td>Playing computer games in the afternoon and evening</td>
<td>11.7 (11)</td>
<td>9.6 (9)</td>
<td>93.6 (88)</td>
<td>6.4 (6)</td>
<td>0.66 (0.00)</td>
</tr>
<tr>
<td>Physical activities in the afternoon and evening</td>
<td>64.9 (61)</td>
<td>42.6 (40)</td>
<td>72.3 (68)</td>
<td>27.6 (26)</td>
<td>0.47 (0.00)</td>
</tr>
</tbody>
</table>

Table 2. Agreement between children’s self-reports and parents’ reports of children’s physical activities and screen-based sedentary activities

Tabela 2. Slaganje odgovora dece i roditelja o fizičkim aktivnostima i sedentarnom ponašanju dece
spent playing computer games in the evening ($\chi^2 = 8.32; p = 0.04$) than boys (40.5%). Overweight and obese children (85.7%) were more likely than normal weight children (14.3%) to report more time spent watching TV ($\chi^2 = 26.38; p = 0.01$) than their parents.

Discussion

The results of this study show that there are differences in the perception of physical activities and screen-based sedentary behavior between 7–10-year-old children and their parents. The Table 2 shows that the agreement between children’s and parents’ responses was significant for each question of the questionnaire, but the level of agreement varied on some issues. The highest level of agreement was found concerning physical activity before school. The analysis of agreement between responses of parents and children showed that most parents and children agreed that children were physically active before school. These results may indicate that children were able to recall physical activities during the morning because those physical activities (playing in the playground, training) were part of their daily routines and parents were aware of the same. Unlike physical activity in the morning, the level of agreement between responses of parents and children about physical activities after school was just below the moderate. Approximately one fourth of children and parents disagreed whether children were physically active after school. More parents than children reported that children were engaged in physical activity after school. The above result may indicate that it was more difficult for children to remember what they did in the afternoon than in the morning, especially if afternoon activities vary from day to day more than late morning activities. It can be assumed that in the period when this study was performed, children spent more time outdoors before school than after school. Several studies showed that parents tend to give socially desirable answers when it comes to physical activity of their children [8, 17]. All this may indicate that the disagreement between children’s self-reports and parent’s reports of physical activities after school may be a result of overestimation of physical activity of children by their parents or tendency of parents to give desirable answers.

A moderate level of agreement (kappa = 0.59; kappa = 0.66) between responses of parents and children was found regarding playing computer games before and after school. The analysis of agreement between individual responses of parents and children indicated that they generally agreed that children did not play computer games in the morning and in the afternoon. This result may indicate that playing computer games was to some extent controlled by parents and that the use of computers was not available as much as watching TV. The study by Sithole et al. also showed higher degree of agreement between responses of parents and children about playing computer games than watching TV [17].

The lowest level of agreement between the answers of parents and children was about watching TV before and after school (kappa = 0.21; kappa = 0.39). This result is consistent with other studies which showed that responses of parents and children matched the least when it comes to watching TV [8, 17]. This finding may indicate that watching TV was less controlled by parents than playing computer games and that television was more accessible to children than the computer. The analysis of individual responses revealed that the lowest percentage of children and parents agreed that children did not watch TV in the morning. This result indicates that watching TV was less under control of parents in the morning than in the afternoon, which was expected given that parents are usually at work in the morning.

The Table 3 shows agreement between parents’ proxy reports and children’s self-reports of time spent watching TV and playing computer games. Approximately one fifth of parents and children did not agree on the amount of time children spend

<table>
<thead>
<tr>
<th>Activities/Aktivnosti</th>
<th>Responses agreed Odgovori se slažu % (n)</th>
<th>Responses disagreed Odgovori se ne slažu % (n)</th>
<th>Children reported more time Deca prijavila duže vreme % (n)</th>
<th>Children reported less time/Deca prijavila kraće vreme % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watching TV in the morning and noon</td>
<td>73.8 (45)</td>
<td>21.3 (13)</td>
<td>11.5 (7)</td>
<td>9.8 (6)</td>
</tr>
<tr>
<td>Gledanje televizora pre podne</td>
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<tr>
<td>Watching TV in the afternoon</td>
<td>63.9 (39)</td>
<td>26.3 (16)</td>
<td>21.4 (13)</td>
<td>4.9 (3)</td>
</tr>
<tr>
<td>Gledanje televizora popodne</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Watching TV in the evening</td>
<td>60.7 (37)</td>
<td>36.0 (22)</td>
<td>18.0 (11)</td>
<td>18.0 (11)</td>
</tr>
<tr>
<td>Gledanje televizora uveče</td>
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<tr>
<td>Playing computer games in the morning and noon</td>
<td>67.2 (41)</td>
<td>26.3 (16)</td>
<td>19.7 (12)</td>
<td>6.6 (4)</td>
</tr>
<tr>
<td>Igranje na računaru pre podne</td>
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<tr>
<td>Playing computer games in the afternoon and evening</td>
<td>68.9 (42)</td>
<td>21.3 (13)</td>
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<td>9.8 (6)</td>
</tr>
<tr>
<td>Igranje na računaru popodne i uveče</td>
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</table>

*Table 3. Agreement between children’s self-reports and parents’ reports of children’s screen-based sedentary time during the day (n = 61)*

Tabela 3. Slaganje odgovora dece i roditelja o vremenu provedenom u sedentarnim aktivnostima tokom dana (n = 61)
watching TV in the morning or playing computer games in the evening. Around one fourth of children and parents disagreed on the time children spend watching TV in the morning or playing computer games in the evening. About one third of parents and children disagreed on the time children spend watching TV in the evening. An equal number of children reported spending more or less time watching TV in the evening compared to their parents. The obtained result is in line with previously presented results related to the agreement between parents’ and children’s responses about watching TV after school. Both results confirm that neither parents nor children have a clear awareness of how much time children spend watching TV. In accordance with findings of other studies, the results of this research indicate that both children and parents lack awareness of children’s screen-based sedentary time [8, 17]. The children reported more screen-based sedentary time than their parents. Previous studies showed that parents as proxy reporters were prone to socially desirable responding and reporting less screen-based sedentary time [8, 17]. These results are important considering that home environment is strongly correlated with children’s physical activity and sedentary behavior [18].

Analyzing the difference between reports of parents and children, we found that significantly more first grade children and their parents reported that children were engaged in physical activities before school. This result is expected given that different studies showed that younger children are more physically active than older children [19]. Among those who disagreed with their parents in terms of watching TV or playing computer games before and after school, most of them were children from the first grade. This finding is consistent with other research confirming that 7- to 8-year-old children are not able to independently provide reliable data on food intake and physical activity [3, 20–22].

The finding that girls’ responses agreed more with the responses of their parents regarding the time spent playing computer games can be explained by the fact that boys play computer games more often than girls and that computer use is less under control of parents in boys than in girls [23].

The only significant difference between parents’ reports and children’s self-reports in relation to BMS was concerning the time children spent watching TV before school. Overweight children were significantly more likely than normal weight children to report longer time spent watching TV compared to their parents. This result may be due to the fact that parents of overweight children tended to give socially desirable responses by reporting less screen-based sedentary time. Sithole et al. found that overweight and obese children reported less time watching TV than their parents [17]. The sample of this study included children from the fifth grade, so it can be assumed that older children are more prone to socially desirable responses than younger children.

This study was conducted on a small sample of 7- to 10-year-old children from two elementary schools and therefore the results may not be representative for the entire population of school-aged children in Serbia. The study compared parents’ reports and children’s self-reports without comparisons with more objective methods for assessing physical activity and screen-based sedentary time in children (accelerometer, pedometer, observation). Thus, it is not possible to determine whether parents or children gave more reliable information. Data on height and weight were based on the information given by parents. However, Huybrechts et al. have shown that parents can give reliable information about height and weight of their children if they received instructions on how measurements should be performed [24, 25].

Future research should test differences in the assessment of physical activities and screen-based sedentary time on a representative sample of school-aged children and their parents.

**Conclusion**

This research showed that there were differences in reports of physical activities and screen-based sedentary time between children aged 7 to 10 years and their parents, which must be taken into consideration when using questionnaires for self-assessment of physical and screen-based sedentary behavior in children. The greatest differences in the assessment of physical activity was found between 7-year-old children and their parents and the recommendation is that 7-year-old children should not fill out questionnaires about physical activities and screen-based sedentary behavior by themselves. Parents’ and children’s reports agreed the least about the time spent watching television indicating low level of awareness and control of this screen-based sedentary behavior.

**Implications for practice**

Due to the inability to precisely estimate the time spent watching television, questionnaires for the assessment of screen-based sedentary behavior should use intervals of time within which it is easier for children and parents to estimate screen-based sedentary time.

The research using objective methods for the assessment of physical activities and screen-based sedentary behavior (observation) would show whether children or parents are more reliable in reporting physical activities and screen-based sedentary time in children.
References