RELIABILITY OF THE SELF-REPORT QUESTIONNAIRE FOR THE ASSESSMENT OF THE LEVEL OF LEISURE-TIME PHYSICAL ACTIVITY IN PRIMARY SCHOOL PUPILS

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Abstract

Questionnaire for the assessment of the level of physical activity and leisure-time activities of pupils of the final four years of primary school. Methods: The survey was carried out on a sample of 847 grade 5 – 8 primary school pupils (413 girls and 434 boys) aged 11 – 15. The questionnaire collecting information on how pupils spent their free time in the previous 7 days was administered to pupils during the homeroom period. The pupils were instructed on how to fill out the questionnaire upon which they filled the questionnaire. In order to determine the reliability of the questionnaire, the test-retest method was used on 69 randomly selected subjects (32 boys and 37 girls). The test was conducted by administering the questionnaire to the selected subjects twice within a 15-day period. Results: The results obtained using the test-retest method showed a stable reliability of the questionnaire, ranging from r =0.71 to r =0.81 of the Spearman's rank correlation coefficient. The Cronbach's alpha values were relatively satisfactory for this type of questionnaire at α =0.70, while the 95% confidence interval ranged from 0.67 to 0.73. The interclass correlation coefficient was also relatively high at 0.7. Spearman's rank correlation coefficient was used to determine the criterion-related reliability between the weekly frequency of the activities and the estimated time spent on particular activities over the seven-day period. In the first measurement the correlation for kinesiological activities was r =0.82, and for non-kinesiological activities the measured correlation was r =0.75. The correlation was slightly lower in the second measurement, but it was still statistically significant. For kinesiological activities it was r =0.71 and the correlation coefficient for non-kinesiological activities was r =0.63. Conclusion: Reliability of the designed questionnaire is very high and it can be used to collect reliable information on how pupils in the final four years of primary school spend their leisure time. This type of questionnaire should be further developed before it can be used in epidemiological studies aimed at obtaining relevant leisure-time indicators for school children.

Key words: *children, reliability, questionnaire, physical activity, free time*

Introduction

There are references to physical activity as a concept closely related to motor activity in almost all relevant scientific and professional publications. The World Health Organisation defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure (WHO, 2010). Physical inactivity is a major risk factor in the development of most common chronic conditions, including heart diseases, strokes, cancer, type 2 diabetes and various mental conditions (Bull, 2008). Furthermore, an active lifestyle can reduce the risk of depression, prevent fractures caused by fall in the elderly, improve cognitive functions and improve learning abilities in children (Katzmarzyk and Janssen, 2004). Regular physical activity of an adequate type, intensity, duration and frequency improves one's physical abilities primarily by improving functional abilities of the oxygen and energy transportation systems and the regulatory mechanisms of the nervous system (Mišigoj-Duraković et al., 1999). Physical activity is an indispensible biological impulse for the maintenance of the bodily structures and functions. Most, if not all, adaptive transformations caused by physical activity of moderate frequency and intensity positively affect person's health by improving the structure and/or functional ability of respective organs (Vuori, 2004). Regular physical activity is in close correlation with short-term and long-term health benefits for children and adolescents in the areas of physical, cognitive, emotional and social life. (Sallis et al., 2000; Yang et al., 2006). Positive effects of physical activity on health in childhood and adolescence have been widely recognized (Strong et al., 2005). Health benefits can be identified both as immediate positive effects on health improvement in childhood or as predictors of the health status later in life (Barnett et al., 2009). According to the recommendations of the U.S. Department of Health and Human Services (DHHS, 2008), children and adolescents aged 6 to 17 need 60 minutes of physical activity every day, including moderate and high intensity activities as well as aerobic and body and bone building activities (Cavill et al., 2001; Klasson-Heggebo et al., 2003; Strong et al., 2005; Oja et al., 2010). This recommendation of one hour of physical activity for children and adolescents is in line with several other recent recommendations issued in the USA and Australia. However, in Canada, 90 minutes of every-day physical activity is recommended for youth (Janssen, 2007).

Also, some authors suggest 90 minutes of physical activity every day to reduce the risk of cardiovascular diseases in children and youth (Andersen et al., 2006). Health benefits of physical activity in adults have been recorded in much more detail than those in children (Oja et al., 2010), but there are some indications that this might change. Therefore, planned schedule of physical activity for children is extremely important considering the assumption that a high level of physical activity in childhood might be a key factor in adopting an active life style later in life (Rowland, 2003).

Regular physical activity at a young age is a factor closely correlating with a positive health status in adulthood. Survey methods based on self-reporting on the physical activity levels are the quickest and most acceptable instrument for obtaining information on physical activity. To obtain information on physical activity levels, global questionnaires, short recollection questionnaires and detailed physical activity questionnaires are used (Jurakić, 2009, Biddle et al., 2011). Self-report questionnaires are still the most widely used instrument in assessing physical activity levels. It is therefore essential to identify their advantages and disadvantages and to continually improve their quality (Sallis and Saelens 2000). Since TV viewing accounts for a big part of youths' leisure time (Currie, 2004), self-report instruments focus on the activities of viewing TV and using computer in the assessment of the time spent in sedentary activities. Although some instruments have been developed to encompass other sedentary activities of the youth, a targeted self-report instrument for the youth have not been designed yet (Hardy, Booth, Okely, 2007).

Questionnaires, interviews and journals are subjective methods for the assessment of physical activity levels, which are usually used in epidemiological studies. These instruments provide a wealth of information on physical activity and its energy expenditure and time spent on it and they are therefore the most popular instruments for the assessment of physical activity levels in epidemiological studies (Ainsworth, Montoye and Leon 1994, Barbosa et al., 2007, Janz et al., 2008). The advantages of self-report questionnaires concern their low cost and simple administration and a relatively low burden on the subjects (Trost, 2007., Sallis et al., 1993). The purpose of the study was to determine test-retest reliability of the self-report questionnaire for the assessment of the physical activity level and leisure-time activities in the pupils of the final four years of primary school.

Methods

Sample
The survey was carried out on a sample of 5-8 grade primary school pupils. The age of the pupils ranged from 11 to 15. The total number of the surveyed pupils was 847 (413 girls and 434 boys). All of the pupils were healthy at the time of the research.

The research was carried out in accordance with the Ethical Codex for Research with Children, a document compiled by the Council for Children, an advisory body of the government of the Republic of Croatia. A signed parental consent for the participation in the research was obtained for each subject. The principals of the schools covered by the research gave an approval for the participation of their respective schools in the research. The research was carried out by administering a self-report questionnaire to pupils during the homeroom period and instructing them how to fill it out. The time frame for filling out the questionnaire was 30 minutes. Test-retest reliability of the questionnaire was determined on 69 randomly selected subjects (32 boys and 37 girls). The average age of the subjects was 13.31 ± 1.41. Testing involved administration of the questionnaire to the selected pupils twice in a 15-day period. The assumption was that this period between two surveys was long enough for the subjects not to rely on their memory in reporting, and yet short enough for the assessed behaviour not to have changed.

Measuring instrument
To assess pupils' leisure-time activity levels a questionnaire construed for the purposes of this research was used. It assessed the activity levels in the previous 7 days. It consisted of three parts. The first part of the questionnaire collected general information on the subject: name of the subject, name of the school, sex, age and grade. The second part of the questionnaire focused on kinesiological activities, whereas the third part referred to non-kinesiological leisure time activities.

Assessed leisure-time kinesiological activity levels
The part of the questionnaire assessing kinesiological activity comprised 18 variables involving various kinesiological activities (track and field, swimming, gymnastics, karate, taekwondo, wrestling, tennis, table tennis, badminton, handball, basketball, football, dance – acrobatic rock and roll, rowing and/or kayaking, jogging or running, walking for exercise, cycling, rollerblading). In addition to the specified kinesiological activities, the pupils could add an activity which was not listed in the questionnaire. For each of the listed activities, the subjects were asked to report whether they had or had not engaged in it in the previous seven days.

If the answer was "yes", they had to specify the total amount of time spent on a particular kinesiological activity in the seven-day period. The time was specified in hours. Based on the answers to the questions in this part of the questionnaire, the subjects were divided into two categories, as follows:
➢   *physically inactive subjects* (spending <u>less than 60 minutes</u> of their leisure time a day in a kinesiological activity), and
➢   *physically active subject* (spending <u>more than 60 minutes</u> of their leisure time a day in a kinesiological activity).

Assessed leisure-time non-kinesiological activity levels
This part of the questionnaire offered 14 non-kinesiological activities (TV, DVD and video viewing, reading a book, reading newspaper and magazines, playing computer games, surfing the Internet, playing Playstation and similar games, listening to music, talking on the phone, texting, shopping with the parents, going to the movies, helping with the house chores, attending courses (languages, computer, painting, etc.)). In addition to the specified activities, the pupils could add an activity which was not listed in the questionnaire. As in the second part of the questionnaire, the subjects were asked to report whether they had or had not engaged in the listed activities in the previous seven days. If they had, they were asked to specify the total amount of time spent performing a particular activity in the seven-day period. The time was specified in hours.

Data processing methods
The reliability characteristic was expressed as Spearman's correlation range coefficient. Other reliability coefficients used included Cronbach's reliability coefficient, interclass correlation coefficient and standardized reliability coefficient (standardized alpha). Data were processed using STATISTICA for Windows version 5.0. and 7.1. and the data processing programme Statistical Package for the Social Sciences 11.5*.*

Results

The questionnaire collected information on the physical activity levels among pupils and the level of other non-kinesiological leisure-time activities. The subjects have provided information on which activities they engaged in and how many days they engaged in a particular activity over a seven-day period. They also had to assess the total time spent doing the activity in the previous seven days.

Table 1. Test-retest reliability coefficient of the questionnaire on the level of pupils' kinesiological and non-kinesiological leisure-time activities

	Spearman coefficient
Weekly kinesiological activities	0.72*
Kinesiological activities - time	0.79*
Weekly non-kinesiological activities	0.71*
Non-kinesiological activities - time	0.81*

* p<0.05

Table 1 shows correlation coefficients in two measurements. The correlation values for the two measurements range from r =0.71 to r =0.81. This correlation coefficient values fall into the significance level of p< 0.05, indicating reliable stability of the questionnaire and relative reliability of the information on leisure-time activities of 5-8 grade pupils collected using this questionnaire. Table 2 shows reliability parameters of the questionnaire. Cronbach's alpha values are satisfactory, and the 95% confidence interval values range between 0.67 and 0.73.

Table 2. Chronbach's alpha, interclass correlation and 95% confidence interval coefficients of the questionnaire on the level of pupils' kinesiological and non-kinesiological leisure-time activities

Chronbach's alpha α	Standardized alpha	Interclass correlation coefficient	95% confidence interval
0.70	0.69	0.70	0.67 – 0.73

Table 3. Spearman's correlation range coefficient for the questionnaire on the level of pupils' kinesiological and non-kinesiological leisure-time activities

	1st MEASUREMENT		2nd MEASUREMENT	
	Kinesiological activities – frequency level	Non-kinesiological activities – frequency level	Kinesiological activities – frequency level	Non-kinesiological activities – frequency level
Kinesiological activities –time	0.82*		0.71*	
Non-kinesiological activities – time		0.75*		0.63*

* p<0.05

In order to determine reliability with respect to the criterion (Table 3), responses concerning subjects' assessment of their own kinesiological and non-kinesiological activities were compared with the amount of time actually spent doing these activities in the seven-day period. The correlation coefficient value was statistically significant on the significance level p<0.05, and it amounted to r =0.82 for kinesiological activities in the first measurement, while a slightly less statistically significant correlation (r =0.75) was determined for non-kinesiological activities. The second measurement was characterised by slightly lower, yet statistically significant, correlations for both kinesiological (r =0.71) and non-kinesiological activities (r =0.63).

Discussion

In order to collect information on the level of leisure-time physical activities and other leisure-time activities of pupils of the final four years of primary school, a questionnaire was developed. Reliability of the questionnaire was determined using the test-retest method on a sample of 69 pupils of the average age of 13.31 ± 1.41. The questionnaire was designed so as to allow children to self-report on their engagement in kinesiological and non-kinesiological activities in the previous seven days. Obtained information showed that the questionnaire has stable reliability ranging from r =0.71 to r =0.81 of Spearman's correlation coefficient. For questionnaires of a similar type, Crocker et al. (1997) determined test-retest correlation ranging from r =0.75 to r =0.82. Other authors (Sallis et al., 1993, Godin and Shephard,1984, Linder et al., 1983) have determined similar test-retest correlation coefficients in their studies (ranging from r =0.70 to r =0.84).

These values were thus to be expected considering that 15 days elapsed between the two measurements and that school children in grades 5 to 8 do not have fixed habits. Furthermore, the determined Chronbach's alphas were on the level α =0.70, which is slightly below the level determined in the study by Moore et al. (2007) for the population of American children of European origin (α = 0.75) and higher that the values for American children of African origin (α = 0.56). The values of the interclass correlation coefficient were relatively high (0.70). Similar values were determined by Huang et al. (2009). Slightly lower results for the interclass correlation coefficient were obtained in some other studies (Hong et al., 2012., Barbosa et al., 2007., Strugnell et al., 2011) based on differently designed questionnaires administered to subjects of similar age groups. Studies show differences in reliability and validity of self-report questionnaires targeting younger population (Huang et al., 2009, Moore et al., 2007). Comparison of questionnaires is hindered by differences in the methods used in carrying out surveys (independent responses, assistance of the researcher, computer assistance), the recollection period (1-7 days, one month to one year) (Sallis and Saelens, 2000) and the wording in the questionnaire ("typical week", "regular week" and "last week"). In the assessment of reliability of an instrument, it can be determined that the instrument has satisfactory reliability if the reliability coefficient is 0.70 or higher (Milas, 2005, Mejovšek, 2008). Reliability of the questionnaire was also determined by comparing the responses regarding pupils' independent assessment of kinesiological and non-kinesiological activity levels and the amount of time they spend performing these activities in the previous seven-day period. Spearman's coefficient was statistically significant on the significance level $p<0.05$ at $r =0.82$ for kinesiological activities. A slightly lower, yet statistically significant, Spearman's coefficient was determined for non-kinesiological activities ($r =0.75$). The correlation coefficient was somewhat lower in the second measurement, but it remained statistically significant. These results confirm that the responses that the pupils provided in the first questionnaire significantly correlated with the actual time which the pupils spent in the given kinesiological and non-kinesiological activities over the seven-day period and that the pupils generally provided truthful answers. It is in most cases not possible to draw immediate comparisons between reliability of our questionnaire and questionnaires used in other studies, but they can be used to provide context for the assessment of the reliability of our questionnaire. Even though the purpose is the same (to assess daily physical activity levels in children), questionnaires used are differently construed and researchers make slight adjustments taking into account specificities of the given population. Since questionnaires are the most commonly used instruments for the assessment of physical activity in epidemiological studies, it is important to standardize the content and the design of the instrument for the assessment of physical activity levels in the population and to define questions to be used to collect information on various forms of physical activity and to be applicable to all socioeconomic, ethnic, gender and age groups (Ainsworth et al., 1994).

There is a lot of room for the improvement of the quality of questionnaires as instruments for the assessment of physical activity in children, as well as the totality of leisure-time activities that children engage in. A very important advantage of this type of research is its cost-effectiveness. Questionnaires are the most acceptable way to obtain quick and reliable data since they do not involve the use of expensive equipment that measures time spent in a physical activity. Finally, this type of questionnaire can also be used to collect information on the amount of time that pupils spend in other, non-kinesiological leisure-time activities, such as TV viewing, using computer or talking on the phone.

Conclusion

The presented evidence suggests that the questionnaire is a reliable instrument that can be used to obtain reliable information on leisure-time activities of the pupils of the final four grades of primary school. This type of questionnaire needs to be further improved and effort should be made to develop high-quality models through an interdisciplinary approach, allowing researchers in epidemiological studies to obtain relevant and quick information on leisure-time activities of children at a low cost.

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POUZDANOST SAMOEVALUACIJSKOG UPITNIKA ZA PROCJENU RAZINE
TJELESNE AKTIVNOSTI U SLOBODNOM VREMENU UČENIKA OSNOVNIH ŠKOLA

Sažetak

Primjenjen je upitnik za procjenu razine tjelesne aktivnosti u slobodno vrijeme za učenike četiri završna razreda osnovne škole. Metode: Istraživanje je provedeno na uzorku od 847 učenika 5.-8. razreda osnovne škole (413 djevojčica i 434 dječaka) u dobi od 11-15 g. Upitnikom su prikupljane informacije o tome kako učenici provode svoje slobodno vrijeme u prethodnih sedam dana, a ispunjavali su tijekom sata razrednika. Učenici su dobili upute o tome kako popuniti upitnik. Kako bi se utvrdila pouzdanost upitnika, test-retest metodom na 69 slučajno odabranih ispitanika (32 dječaka i 37 djevojčica). Ispitivanje je provedeno s odabranim temama dva puta unutar 15 - dnevnog razdoblja. Rezultati: rezultati su dobiveni test-retest metodom i pokazali su stabilnu pouzdanost upitnika, u rasponu od r = 0,71 do r = 0,81 Spearmanovog koeficijenta korelacije ranga. Cronbach alfa vrijednosti bile su relativno povoljne za ovu vrstu upitnika na α = 0,70 , dok se 95 % interval pouzdanosti kretalo 0,67-0,73. Koeficijent korelacije je također relativno visok i iznosi 0,7. Spearmanov koeficijent korelacije se koristiti za određivanje kriterija povezanih pouzdanosti između tjedne učestalosti aktivnosti i predviđenog vremena provedenog u određenoj aktivnosti tijekom sedmodnevnog razdoblja. U prvom mjerenju korelacija za kineziološke aktivnosti bila je r = 0,82 , a za ne - kineziološke aktivnosti r = 0,75. Korelacija je nešto niža u drugom mjerenju ali je još uvijek statistički značajna. Za kineziološke aktivnosti bilo je r = 0,71, a koeficijent korelacije za ne - kineziološke aktivnosti bio je r = 0,63. Zaključak: Pouzdanost projektiranog upitnika vrlo je visoka i upitnik se može koristiti za prikupljanje pouzdanih informacija o tome kako učenici u završne četiri godine osnovne škole provode svoje slobodno vrijeme. Ovu vrsta upitnika treba dalje razvijati prije nego što može biti korišten u epidemiološkim studijama čiji je cilj dobivanje relevantnih pokazatelja slobodnog vremena za školsku djecu .

Ključne riječi*: djeca, pouzdanost, upitnik, tjelesna aktivnost, slobodno vrijeme*

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