

Part II. Physical activity of social and professional groups
Dział II. Aktywność fizyczna grup społecznych i zawodowych

IN SEARCH OF THE ASSESSMENT OF THE PHYSICAL ACTIVITY LEVEL
OF THE YOUTH WITH THE USE OF THE IPAQ

W POSZUKIWANIU OCEN POZIOMU AKTYWNOŚCI FIZYCZNEJ MŁODZIEŻY
Z WYKORZYSTANIEM IPAQ

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Authors' contribution
Wkład autorów:
A. Study design/planning
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B. Data collection/entry
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C. Data analysis/statistics
dane – analiza i statystyki
D. Data interpretation
interpretacja danych
E. Preparation of manuscript
przygotowanie artykułu
F. Literature analysis/search
wyszukiwanie i analiza literatury
G. Funds collection
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Summary

Background. Keeping track of the research on the physical activity of young people from different countries allows for making its assessment objective, particularly when using the same questionnaire (IPAQ).

Material and method. The study presents data on the level of physical activity of young people using the IPAQ questionnaire in a short and long form. Research results were sourced from 8 electronic databases: MEDLINE/PubMed, ArXiv, IEEE, CiteSeer, SPORTDiscus, Health Source-Nursing/Academic Edition, Academic Search Complete, MasterFILE Premier for 2008-2016 which referred to the studies from Poland, Czech Republic, Slovakia, Hungary and Lithuania, Spain, Croatia, Greece, selected European countries and Mexico.

Results. Significantly higher values expressed in MET-min./week were shown in the IPAQ questionnaire in a long than in short form. Most research results with higher physical activity of boys than girls were also confirmed.

Conclusions. Large discrepancies in the data on the level of physical activity of young people from different countries should serve as indication for a better preparation of those conducting research with this questionnaire.

Keywords: youth, physical activity, short and long form of IPAQ, international research

Streszczenie

Wprowadzenie. Śledzenie badań aktywności fizycznej młodzieży z różnych państw umożliwia obiektywizację jej oceny szczególnie przy zastosowaniu tego samego kwestionariusza (IPAQ).

Materiał i metody. W pracy zaprezentowano dane dotyczące poziomu aktywności fizycznej młodzieży z wybranych badań wykorzystujących kwestionariusz IPAQ w wersji krótkiej i długiej. Wykorzystano w tym celu opracowanie z 8 baz elektronicznych: MEDLINE/PubMed, ArXiv, IEEE, CiteSeer, SPORTDiscus, Health Source-Nursing/Academic Edition, Academic Search Complete, MasterFILE Premier za lata 2008-2016, a dotyczyły one młodzieży z Polski, Czech, Słowacji, Węgier, Litwy, Hiszpanii, Chorwacji, Grecji, wybranych państw Europy i Meksyku.

Wyniki. Wykazano znacznie wyższe wartości wyrażone w MET-min/tydz. w kwestionariuszu IPAQ w wersji długiej niż krótkiej. Potwierdzono też u obu wyższą aktywność fizyczną chłopców niż dziewcząt.

Wnioski. Duże rozbieżności uzyskanych danych dotyczących poziomu aktywności fizycznej młodzieży z różnych państw powinno być wskazówką lepszego przygotowania prowadzących badania tym kwestionariuszem.

Słowa kluczowe: młodzież, aktywność fizyczna, wersja krótka i długa IPAQ, badania międzynarodowe

Introduction

Widely appreciated suitable physical activity for the sake of a healthy lifestyle is assessed with considerably different methods, which does not contribute to the objectivity of approach to this phenomenon. For this purpose, a team of scientists has developed the International Physical Activity Questionnaire, intended for people aged 15-69 years [1,2] to allow for tracking the tendency of changes and compare the level of physical activity in different countries. Biernat, Stupnicki and Gajewski adjusted the version of this questionnaire to Polish conditions [3]. Research on physical activity among school youth in Poland on a relatively large population are not very common [4,5,6,7,8,9].

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In order to scrutinise the results of the studies with the use of the IPAQ questionnaire, a review of studies from eight electronic databases, i.e. MEDLINE/PubMed, ArXiv, IEEE, CiteSeer, SPORTDiscus, Health Source-Nursing/Academic Edition, Academic Search Complete, MasterFILE Premier, was undertaken, which is the main content of this work.

Method and research material

In order to find original works examining the physical activity of young people with the use of the International Physical Activity Questionnaire IPAQ – long or short form, the following electronic databases were searched: MEDLINE/PubMed, ArXiv, IEEE, CiteSeer, SPORTDiscus, Health Source-Nursing/Academic Edition, Academic Search Complete, MasterFILE Premier. The following keywords and their combinations were applied: IPAQ, youth, adolescents, physical activity. The main selection criteria for this article were: the application of the tool in the form of the IPAQ- long or short form in the study, research conducted among youth, presentation by the authors the analysis of the results regarding the level of physical activity in MET values. Selected articles that met the above criteria include studies from Poland, the Czech Republic, Slovakia, Hungary, Lithuania, Greece, Spain, Mexico, Croatia. For comparison purposes, the decision was made to choose one article from outside the designated search criteria, namely the study on groups of young people from the international research project the HELENA study (Healthy Lifestyle by Nutrition in Adolescence), where validation studies of the IPAQ modified questionnaire - IPAQ-A were conducted. The selected articles are presented in two tables. Table 1 shows the selected studies with the use of the IPAQ-short form, while Table 2 contains the studies using the IPAQ-long form. Studies were analysed in accordance with the following criteria: name and surname of the author, year of research, year of publication, place of study, the additional research tools, age and gender, physical activity level (PAL) in MET-min./week, MET-min./day, or MET-hour/week, adopted manner of data analysis, the objective and conclusions.

In most of the selected international works the research group was formed by only youth attending secondary school [10,11,12,13,14,15,16], but some studies were also devoted to other populations. Cocca A. et al. [17] researched people aged 9-24, starting from the third-grade pupils of primary school and ending with university graduates. Other studies were devoted to the entire population of a given country. Jurakić D. et al. [18] researched the Croatian population aged 15-64 and over 65 years. Knowing that the International Physical Activity Questionnaire (IPAQ) is intended for a population aged 15-69, the decision made by some researchers to select this tool for application to persons below or above the recommended age may be perceived as debatable. The authors of the research from Spain [17] provided the following explanation. Whenever an interview with a child was conducted with their parent present, attempts were made to simplify the words used and provide simple, practical examples. In order to avoid excessive influence of the researchers' expectations on the children's opinion, PE teachers previously trained in conducting research using the said instrument, were asked to carry out the interview. The authors have also indicated that the results of the analysis of the physical activity level in the younger age group up to 15 years of age should be treated with the utmost caution. They also recommended the use of an objective measuring method such as an accelerometer, which is increasingly more often applied in the recent years in youth research [19,20,21,22,23,24,25].

Discussion

A summary of 10 articles relating to the years 2008-2016, collected from the eight electronic databases regarding studies on the physical activity of youth that involved the use of the International Physical Activity Questionnaire in the long and short form, does not demonstrate very frequent application of the above mentioned questionnaire. It is possible that one of the reasons for this may be the difficulty in its application, which requires very laborious training of the persons engaged in research, to which attention was drawn in Poland by Gajewski and Biernat [26] and Bergier [27]. The results of total physical activity expressed in metabolic equivalent units - MET were characterised by a very large discrepancy. The short form showed results ranging from 2.219 MET min./week to 4.592 MET min./week for girls, and from 2.640 MET min./week to 5.985 MET min./week for boys (following the analysis of 7 days). It should be noted that the values for boys were higher than for girls. The research conducted with the use of the long form of the IPAQ showed much higher values, which ranged from 2.232 to 7.287 MET min./week for girls, and from 3.074 to 10.280 MET min./week for boys. To standardise the calculation of the total physical activity expressed in the MET min./week units, calculations were made for reporting the data for one day (multiplying by 7 days), and for reporting the data using the hour unit (multiplying by 60 min.).

The obtained lower values of the total physical activity in the IPAQ short form compared to the long form serve as indication that the collected results should be compared only within a given version of the questionnaire.

Table 1. A summary of selected international research on the physical activity of young people using the IPAQ – short version

The first Author, year of publication	Place of research	Year of research	Aim of research	PA* in MCET -min./week	The method of data analysis	Age (years)	Conclusions						
Bergier B. et al. 2014	Poland (selected regions)	2011	Assessment of the PA* level and the influencing factors (gender, place of residence, sedentary behavior, participation in physical education classes)	<table border="1"> <tr> <td>girls</td> <td>boys</td> </tr> <tr> <td>2.219</td> <td>2.640</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> The values for the total PA * </td> </tr> </table>	girls	boys	2.219	2.640	<ul style="list-style-type: none"> The values for the total PA * 		***M	16-18	<ul style="list-style-type: none"> Boys were more active than girls Among boys intensive efforts prevailed while among girls moderate efforts were predominant PA* level was not dependent on the place of residence Teenagers who more often led sedentary life-style showed a lower total PA *
girls	boys												
2.219	2.640												
<ul style="list-style-type: none"> The values for the total PA * 													
Cocca A. et al. 2014	Spain (Granada)	school year 2010/2011	Assessment of the PA* level among youth and young adults; determination of the percentage fulfilling international recommendations of HRPA **	<table border="1"> <tr> <td>girls</td> <td>boys</td> </tr> <tr> <td>**** 656.08 ± 386.66</td> <td>**** 855.07 ± 344.10</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> Daily </td> </tr> </table>	girls	boys	**** 656.08 ± 386.66	**** 855.07 ± 344.10	<ul style="list-style-type: none"> Daily 		***M ± SD	16-17	<ul style="list-style-type: none"> Approximately 50% of high school students fulfilled the recommendations of HRPA ** ****: multiply the daily value by 7 days, we obtain the result in MET-min./week among girls – 4.592 and among boys – 5.985
girls	boys												
**** 656.08 ± 386.66	**** 855.07 ± 344.10												
<ul style="list-style-type: none"> Daily 													
Tsioufifis C. et al. [2010]	Greece (Athens)	April 2009	Determining the relations between the PA* level and the level of blood pressure	<ul style="list-style-type: none"> Analysis in relation to gender was not presented Total PA* value was not shown 3 levels of PA *: Low: 372.8 ± 180.1 Moderate: 1.558.1 ± 589.8 High: 4.330.0 ± 2.306.6 	*** M ± SD	12-17	Intensive physical activity among teenagers, especially among boys, was associated with higher levels of systolic blood pressure and pulse pressure than in the case of low and moderate activity						

* PA- Physical Activity, ** HRPA Health Related Physical Activity, *** M- Mean ± SD- Standard Deviation
Source: own research

Table 2. A summary of selected international research on physical activity of young people using the IPAQ – long version

The first Author, year of publication	Place of research	Year of re-research	Aim of research	PA* values	The method of data analysis	Age (years)	Conclusions																				
Bergier B. et al. 2012	Lithuania (Vilnius)	Spring 2010	Assessment of PA*, determination of BMI and sports interests, self-assessment of physical fitness	<table border="1"> <tr> <th colspan="2">The values for the total PA* in MET-min./week</th> </tr> <tr> <td>girls</td> <td>boys</td> </tr> <tr> <td>4.404</td> <td>4.895</td> </tr> </table>	The values for the total PA* in MET-min./week		girls	boys	4.404	4.895	**M	17	<p>The level of total PA* among Lithuanian teenagers was high; this level was higher for boys, especially in the area of intensive efforts</p> <p>Girls and boys assessed their own free time differently. Boys more often than girls stated that they have enough free time. However, a greater amount of free time did not result in a significant increase of physical activity</p> <p>Boys assessed their own fitness much more positive than girls</p> <p>Young people with higher self-assessment of physical fitness were more active, especially in the area of intensive efforts</p>														
The values for the total PA* in MET-min./week																											
girls	boys																										
4.404	4.895																										
Kudláček M. [2013]	The Czech Republic	-	The analysis of preferences in the range of sports disciplines among high school students in order to improve programs of PE lessons	<table border="1"> <tr> <th colspan="4">The values for the total PA* in MET-min./week</th> </tr> <tr> <td colspan="2">girls</td> <td colspan="2">boys</td> </tr> <tr> <td>aged 15</td> <td>aged 16</td> <td>aged 17</td> <td>aged 18</td> </tr> <tr> <td>2.372</td> <td>3.742</td> <td>4.467</td> <td>3.219</td> </tr> <tr> <td colspan="2">5.220</td> <td colspan="2">6.564</td> </tr> </table>	The values for the total PA* in MET-min./week				girls		boys		aged 15	aged 16	aged 17	aged 18	2.372	3.742	4.467	3.219	5.220		6.564		***Mdn	15-18	<p>Differences in levels of PA* among girls and boys were not as great as it was a few decades ago</p> <p>It was possible to observe dynamic development of the structure of sports preferences. However, there was a whole spectrum of sports disciplines which are always preferred - football, volleyball, aerobics and swimming</p> <p>Appropriate use of the results of this research could increase the total PA* of young people at school and improve the effectiveness of school PE lessons</p>
The values for the total PA* in MET-min./week																											
girls		boys																									
aged 15	aged 16	aged 17	aged 18																								
2.372	3.742	4.467	3.219																								
5.220		6.564																									

Vašíčková J. et al. [2013]	Poland (Katowice)	-	Assessment of the differences in PA* levels after 4 weeks of using a pedometer between the experimental group and the control group, establishing gender-related differences	The values for the total PA* in MET-min./week				15-17	**M	It was shown that the use of pedometers could significantly reduce the differences in the PA* level between teenage boys and girls during weekdays as well as weekends The PA* level did not decrease during the use of the pedometer for 4 weeks Intervention with monitoring PA* with a pedometer was effective in promoting PA* among young boys and girls, stimulating self-awareness of a healthy lifestyle
				control group		experimental group				
Ács P. et al. [2016]	Visegrad Countries:	April 2015	Assessment of the differences in PA* in relation to gender among secondary school students in the V4 Countries	• The values for the total PA* in MET-min./week				15-18	**M	Significant differences in the area of physical activity in the Visegrad countries in relation to gender were shown In the face of the existence of well-defined measures addressing physical activity in specific risk groups, these differences should have impact on the necessity of their intensification among secondary school students
				girls		boys				
				8.510	10.835	9.190	11.789			
				4.079.6			4.546.4			
				5.862.0			7.520.2			
Cocca A. et al. [2015]	Mexico (General Escobedo, Monterrey)	-	Assessment of PA* level of secondary school students. An attempt at analysing models explaining the differences between girls and boys in PA* levels	• Total PA* value not shown • Shown values for 3 levels of PA* in MET-min./week				Mean age: 14 years	**M	PA* levels of Mexican youth were generally low and therefore intervention programs should be applied In order to create suitable programs, it should be important to explore and understand social and environmental factors and to take into account special needs of the study population
				PA* levels		boys				
				low		433.56	608.33			
			moderate		889.48	1.133.68				
			high		2.498.86	2.941.08				

Jurakić D. et al. [2009]	Croatia	November 2007	The assessment of the PA* level of Croatian population in various areas of life	<p>The values for the total PA* in MET-hours/week</p> <table border="1"> <tr> <td>girls</td> <td>boys</td> </tr> <tr> <td>**** 37.2 (32.0-42.4); 46.7</td> <td>**** 52.9 (42.3-63.6); 53.0</td> </tr> </table> <ul style="list-style-type: none"> The values shown in MET-hours/week Median (95% CI); iOR The median in MET-hr/week calculated in accordance with the calculation protocol of IPAQ (IPAQ scoring protocol) CI - Confidence interval for the Median calculated according to the Bonett and Price's method iOR - interquartile range in MET-hr/week calculated in accordance with the calculation protocol of IPAQ 	girls	boys	**** 37.2 (32.0-42.4); 46.7	**** 52.9 (42.3-63.6); 53.0	15-24	The lowest PA* level was found among teenagers and young adults, so in these age groups properly developed intervention strategies should be implemented **** multiplying the total PA expressed in MET-hours/week by 60 min we obtain the value of MET-min./week for girls - 2.232 and for boys- 3.174
girls	boys									
**** 37.2 (32.0-42.4); 46.7	**** 52.9 (42.3-63.6); 53.0									
Hagströmer M. et al. [2008]	9 centres of the HEL-ENA study Athens, Rome, Stockholm, Pecs, Lille Dortmund, Vienna, Ghent, Zaragoza		Examination of the accuracy of the modified version of the IPAQ - IPAQ-A questionnaire by using an accelerometer	<p>The values for the total PA* in MET-min./day</p> <table border="1"> <tr> <td>aged 12-14</td> <td>aged 15-17</td> </tr> <tr> <td>**** 709 ± 547</td> <td>**** 592 ± 438</td> </tr> </table> <ul style="list-style-type: none"> Lack of analysis in relation to gender 	aged 12-14	aged 15-17	**** 709 ± 547	**** 592 ± 438	12-17	The results of this study showed that the IPAQ-A had sufficient accuracy attributes for the assessment of the intensity of physical efforts and total physical activity in healthy European teenagers at the age of 15-17. For young people aged 14 and younger the correlations were unsatisfactorily low and the objective methodology, such as accelerometry, might be an appropriate alternative **** multiplying the total PA* expressed in MET-hours/day by 7 days we obtain the value of MET-min./week for 12-14-year-olds - 4.963 and 4.144 for 15-17-year-olds
aged 12-14	aged 15-17									
**** 709 ± 547	**** 592 ± 438									

*PA-Physical Activity, **M-Mean ± SD-Standard Deviation, ***Mdn - Median, ****HRPA - Health Related Physical Activity
Source: own research

The described results represent a significant value due to the authors' search for a variety of factors determining the physical activity level of youth: place of residence, duration of free time, preferred sport, physical activity self-assessment, HRA recommendations, pressure level. The presented results of the research on physical activity level and its determining factors among youth from different countries of the world constitute an important addition to their systematisation.

Conclusions

The presented results of the studies on the total physical activity level of youth in different countries showed high diversification, which may serve as indication for carrying out more detailed discussion on the IPAQ questionnaire in use. It appears that the optimum mode of research is direct contact with the study subject. The suggestion of supplementing the IPAQ research on physical activity with an accelerometer becomes apparent.

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