

PHYSICAL ACTIVITY LEVEL OF THE YOUTH IN SELECTED COUNTRIES OF THE WORLD

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Summary: Physical activity is one of the most important elements of a healthy lifestyle, and its lack or insufficient amounts can lead to serious health disorders. There are many adult diseases which are associated with the behaviour, lifestyle during puberty, including physical inactivity. It was therefore decided in this study to present the physical activity of young people from six countries in the world in the context of different variables. The following countries: Brazil, Spain, Poland, Czech Republic, Norway and Nepal were selected for comparison. Although all studies used the same standardized research tool, ie. the International Physical Activity Questionnaire IPAQ, in the course of analysis, the authors encountered difficulties with comparability, associated with the usage of various methods and data processing, which could result in different or reduced comparability. Consequently, it was decided not to make a detailed comparative analysis of individual research results and the presentation of the key conclusions brought about selected studies worldwide. Analyses of studies which have been conducted in different cultural contexts, confirm once again the thesis of the decline in physical activity levels with age for both girls and boys. Gender quite substantially differentiated physical efforts in adolescents. Girls at the age of adolescence are less physically active than boys. It was also noted that the increase of sedentary behaviour among children and adolescents and their disastrous consequences have an impact on the health and life in this age group, the studies of sedentary lifestyle have become a very important subject of many studies. Girls are still "more sedentary" than boys. Many authors, in order to ensure the reliability and relevance of their research, complied with the objective instrument eg. accelerometer or metabolic analyzer.

Keywords: physical activity, youth, IPAQ

Introduction

Regular physical activity during adolescence can greatly affect the healthy lifestyle, not just during this period, but also in adulthood, reducing the risk of developing non-infectious diseases (Hayman et al. 2013 Twisk et al. 2000). There are many adult diseases which are associated with the behaviour, lifestyle during puberty, including physical inactivity (Hallal et al. 2006). Studies have shown that young people regularly engaged in physical activity are less exposed to smoking cigarettes, watching TV or being overweight. In contrast, it is more likely that these people will eat healthy food (Patrick et al. 2004, Steptoe et al. 1997).

A sufficient amount of physical activity in youth is associated with weight loss, improvement of metabolic parameters, reduction of blood pressure, insulin resistance, predisposition to maintain physical activity in adulthood, lower risk of diseases of cardiovascular system and consequently, increased lifetime (Hayman et al. 2013). Young people who exercise regularly also have better mental health, better perception of their own health and their own physical fitness (Thorlindsson et al. 1990). Furthermore, they are less exposed to the risk of depression, as well as having a higher assessment of their values (Raglin et al. 2007). Physical activity also plays an important role in shaping attitudes related to achieving the desired objectives and to rivalry (Hassandra et al. 2003). The health benefits of regular physical activity in adolescents and children have been repeatedly highlighted in previous studies (Janssen, LeBlanc 2010). There are also many well-documented studies, confirming the thesis of physical inactivity as a risk factor for coronary heart disease (Armstrong, Simons-Morton 1994), obesity and other chronic diseases (Fletcher et al. 1996).

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Tables: 1 Figures: 0 References: 51 Full-text PDF www.hpc.edu.pl **Copyright** © Pope John Paul II State School of Higher Education in Biała Podlaska, Sidorska 95/97, 21-500 Biała Podlaska **Indexation:** Index Copernicus, AGRO, ProQuest, Polish Medical Bibliography, Polish Ministry of Science and Higher Education. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-commercial license (<http://creativecommons.org/licenses/by-nc/3.0>), which permits use, distribution and reproduction in any medium, provided the original works is properly cited, the use is non-commercial and is otherwise in compliance with the license.

Knowing that the period of transition from childhood to youth age is characterized by an expressive decrease in physical activity (Armstrong, Welsman 2006) and while being aware of the positive impact of physical activity on health and life a number of countries, including the United States of America and the United Kingdom (Cavill et al. 2001, Welk 2002), have introduced their own guidelines or recommendations related to the recommended dose of physical activity in adolescence. The introduction of the guidelines helps the researchers to assess the scale of the changes in physical activity levels within the studied age group, as well as helps government institutions and private entities in working together to promote physical activity. According to Strong et al. (2005) adolescents are recommended the intense physical activity lasting at least 60 minutes for five (or more) days a week. According to the WHO guidelines, exercises must be adapted to the developmental age, and what is more, they should be varied and enjoyable. Youth is recommended to engage in such forms of activities like aerobics, strength training, or coordinative and flexibility exercises. At this age the priority should be the development of motor skills (www.ec.europa.eu -physical-activity-guidelines 2008). Zaza et al. (2005) also claim that any action should be focused on school and sports activities carried out there, because children and young people spend a significant part of their time at and around of the schools.

With decreasing physical activity with age among children and adolescents, a big concern is the predominance of activities related to sitting. Until now, the problem was seen only in terms of lack of physical activity, or unfulfillment of the criterion of an appropriate level of activity. Recently, researchers have found that the sedentary behaviours such as spending time on sitting activities may have an important impact on health, regardless of the time devoted to more active operations. The problem of sedentary lifestyle has therefore also been a major topic of a lot of research (Hamar et al. 2009).

To better understand and promote physical activity and prevent the growing prevalence of sedentary behaviours, particularly in critical transitional life stages, accurate methods for assessing physical activity are needed. There are many techniques that are used to evaluate the physical activity of the population. However, the lack of comparability between them is a major limitation in studies on physical activity. This is due to, among other things, the usage of different methodological instruments and the fact that researches on participation in sport and recreation are carried out independently of each other. And that can lead to many differences in the research project, questionnaires, methodologies, or defining terms (van Bottenburg et al. 2005). The instrument which received positive recommendations of 12 countries from 6 continents is IPAQ – International Physical Activity Questionnaire. It allows you to obtain comparable data relating to routine physical activity of the population of a given country, taking into account both social and cultural context of the country (van Bottenburg et al. 2005).

If we look at studies focusing on physical activity in adolescents in Poland using the IPAQ questionnaire, we come to the conclusion that there is little such work on a relatively large material (for Bergier J. 2012: Stupnicki et al. 2014, Rozpara et al. 2008, Bergier J. et al. 2012). In addition to the Central Statistical Office (CSO) survey of 2008 there is a national investigating of some works on physical activity levels of the adult Polish population through the instrument of the IPAQ (Bergier J. et al. 2010, Biernat 2011, Nawrocka et al. 2013, Garbaciak et al. 2008). Among the studies comparing physical activity during the free time of the Poles and some other nations there have been so far only a few projects, namely Bridging the East-West Health Gap, including three Eurobarometers 213/62.0 and 72.3. and 412/80.2. Comparisons of the level of performance via Eurobarometer 183-6/58.2 with the level represented by the Polish respondents was also made by Piątkowska (2012), and comparisons to other studies of physical activity in Europe were conducted by Biernat and Piątkowska (2013).

The study of physical activity by school youth according to IPAQ

The aim of this study is to present the physical activity level of young people from six countries in the world in terms of different variables. For purposes of comparison the following countries located on three continents were selected: Brazil, Spain, Poland, the Czech Republic, Norway and Nepal (Table 1). The choice was preceded by a thorough analysis of the research papers available in electronic databases EBSCO, Researchgate, SAGE journals. Searched original papers examined the physical activity of adolescents (15-18) using the IPAQ questionnaire (the long version or the short). Because of the fact that there isn't a lot of research worldwide among people in this age group, it was decided to extend the boundaries between the ages of 12-19 years, but still without exceeding the bounds set by the WHO for the definition of adolescence¹. Table 1 presents a summary of selected studies researching the descriptive physical activity depending on socio-demographic factors, anthropometric

¹ WHO defines adolescence as a period of growth and human development, which appears after childhood, and before the period of adulthood. This framework sets at the age of 10 to 19 years. Biological processes are the lifeblood for many aspects of growth and development, including the onset of puberty, which marks the transition from childhood to adolescence. It should be noted also that the biological determinants of adolescence are quite commonly, however, the duration and defining parameters may vary over the years, the culture of a given community or socio-economic status. This period of human life in the last century has experienced many changes, namely prior the beginning of puberty, late age for marriage, urbanization, global communications or changes in attitudes and sexual behavior. http://www.who.int/maternal_child_adolescent/topics/adolescence/dev/en/ (accessed: 11.04.2015).

measures or sedentary behaviours of young people in Europe, South America and Asia. Each of the studies also differed regarding an ambitious objective. During the analysis, the authors have encountered difficulties with comparability, associated with the usage of various methods and data processing, which could result in different or reduced comparability. Consequently, it was decided not to make a detailed comparative analysis of individual research results, and the presentation of the key conclusions brought about selected studies worldwide.

Cocca et al. (2014) researched the physical activity of the age group ranging from 9-24 years of 3.672, however, for the purposes of the study authors focused only on the age group of 14-17 years. Within the study of young Spanish participants two research tools were used: the IPAQ - short version and the Actigraph accelerometer (MTI Actigraph by Computer Science and Application, Inc.). In order to check whether the participants comply with the recommendations for health-enhancing physical activity, frequency analysis was applied. Within 1.365 participants, 56.4% of adolescents (average age 14.3) and 49.3% (average age 16.99) pupils completed with these recommendations. Results of a descriptive analysis of the physical activity levels calculated in minutes showed that the younger group of students was involved in a moderately-intense activities for about 123 minutes during the day, while the older group spent about 92 minutes a day actively. It should be emphasized that the downward trend was observed in terms of physical activity of the participants with the progress of their adolescence, which is fully confirmed in the literature (Armstrong, Welsman 2006, Dumith et al. 2011).

Similar results were achieved by Ranguel et al. 2008 on a sample of Norwegian adolescents (13-18 years). The participants were divided into two age groups, although relatively small number, 13-15 years old (n = 42) and 16-18 (n = 29). The aim of the study was to determine the reliability and validity of the two tools of subjective assessment of the level of physical activity, the IPAQ - short version of the questionnaire and the WHO-HBSC for adolescents by using an accelerometer ActiReg (PreMed AS, Oslo, Norway) and metabolic analyzer Metamax II. The values of physical activity level (PAL stands for Physical Activity Level) for seven days differed significantly between the two age groups. Teenagers from a younger group (13-15 years) were more physically active than the youth from older group (16-18 years). Under the category of "MET <3" boys were physically active for less minutes compared to girls. In this area, younger group achieved less minutes of physical activity than older, while in the "MET 3-6" (minutes) the roles reversed.

Table 1. Summary of the selected international research on physical activity among the youth using the IPAQ

First author	Location	Year of publication	Year of research	Aim of research	Measuring tool	Conclusions	Age
Pelegrini A. [2014]	Brasil (Florianopolis)	2014	2007	Assessment of the sedentary behaviour, moderate, intense PA ^{1*} MVPA) and walking	IPAQ - short version	Boys more active than girls	14-17
Cocca A. [2014]	Spain (Granada)	2014	school year 2010/2011	Assessment of the level of PA with a use of two methods: IPAQ – short version and accelerometer, comparison of the results	IPAQ – short version, accelerometer-Actigraph	Approx. 50% of respondents fulfilled the HRPA ^{2**} recommendations	14-17
Bergier B. [2014]	Poland (selected regions)	2014	2011	Assessment of the level of PA and factors affecting it (sex, place of residence, sedentary behaviour, participation in PE classes)	IPAQ - short version	2.640 MET-boys 2.219 MET-girls	16-18
Mitáš J. [2009]	The Czech Republic (selected regions of the Czech Republic)	2009	Winter 2006	Assessment of the level of PA, sedentary behaviour depending on the school location	IPAQ – short version, accelerometer-Actigraph	Approx. 55% fulfilled the HRPA recommendations for intensive PA	14-15

Rangul V. [2008]	Norway (Nord-Trøndelag)	2008	?	Assessment of the reliability and validity of two IPAQ questionnaires – short version and WHO HBSC	IPAQ – short version, WHO HBSC, accelerometer-Actigraph, metabolic analyzer Metamax II	Boys more active than girls	13-18
Paudel S. [2014]	Nepal (Nepalgunj)	2014	September 2013	Assessment of the PA in leisure time (LTPA) and sedentary behaviour	IPAQ – long version	80% of boys, 50% of girls showed any LTPA ^{3***}	15-20 (on average 17 ± 1.2 year)

*PA – Physical Activity

** HRP – Health Related Physical Activity

*** LTPA – Leisure Time Physical Activity

Source: own research

Although it is not the aim of this study, it should be mentioned that Rangul et al. (2009) came to conclusion that neither of the two examined subjective instruments measuring physical activity in youth met the validation criteria. WHO HBSC questionnaire proved to be an acceptable instrument when it comes to measuring cardio-respiratory condition in girls. The IPAQ (recoded into three categories) seems to be quite a good instrument. What is more, girls' answers turned out to be more reliable and accurate than boys' answers. It makes the IPAQ - short version reasonable and reliable to use, but more so in case of girls.

Studies on physical activity carried out among Brazilian youth (Pelegrini et al. 2014), evaluating the relationship between physical activity (walking, moderate and intense activity) and sociodemographic factors, anthropometric indices and sedentary behaviour showed higher values in walking ($p=0.014$) and intense physical activity ($p<0.001$) for boys than for girls. Girls demonstrated about 198 min/week less intense activity than boys. What is more, youth with high economic status showed higher average participation in intense activity, in comparison to those with mediocre economic status ($p<0.001$). What is interesting, ethnographic research involving teenagers demonstrated that boys receive greater encouragement to physical activity from family and society than girls (Goncalves et al. 2007 after: Pelegrini et al. 2014). This thesis is confirmed by international research (et al. 2007, Seabra et al. 2008, Riddoch et al. 2004) showing a higher probability of girls being physically inactive. Similar trend was observed in another research in Brazil (Ceschini et al. 2009), in which girls were up to 48% less active than boys.

Mitas et al. (2009) also stated that young girls are much more prone to sedentary behaviour, what was deduced from the results characterizing physical activity in the questionnaires. The research was carried out on a representative group of 302 young people, age 14-15, in three chosen regions of the Czech Republic with a use of two research tools the IPAQ –short version and accelerometer Actigraph. In the area of physical activity covering walking (30 minutes/5 days) minimally active was 28.5%, moderately 32.1% and highly active 12.9%. Recommendations for intense physical activity (20 minutes/3 days) were fulfilled by 54.6%. Interestingly, students who achieved the recommended level of physical activity simultaneously showed greater sedentary behaviour. It may result from many factors. One of them may be overstatement presented in the questionnaire data. Another possible explanation is the assumption that people who are physically more active need more time to rest. Especially if they are involved in activities with greater intensity.

In the research carried out by Bergier B. et al. (2014) in the selected regions of Poland on a representative group of 2,974 people aged 16-18, a correlation was found between sedentary behaviour and the level of physical activity. That is, people who spent more time sitting are also characterized by lower total physical activity. No statistical differences between two sexes were found in relation to the level of physical activity in youth, their participation in sedentary life style. The average time spent on sitting was 219.8 minutes, 217.7 minutes for boys and 221.4 for girls. Girls showed also higher (8.6%) level of low total physical activity than boys (6.17%). In the area of moderate total activity girls constituted 23.6%, whereas boys 17.6%. However, boys had a greater participation in the area of high activity: boys 76.2%, girls 67.8% respectively. A significant variation was observed on every level of physical activity in the structure of total activity in relation to sex. Girls showed a higher level of physical activity in the area of walking. The total level of physical activity in school youth expressed in the MET unit reached 2.387, and it was higher in boys (2.640 MET) than in girls (2.219 MET). In the context of physical activity the authors of this paper raised quite a serious problem of skipping physical education classes. This is particularly true for girls growing up and may be associated with processes which

take place in this period of life and which are connected with puberty. The results of the research demonstrated that young people participating in PE classes up to 5 times (5 lesson units) a week show a higher level of physical activity. It can thus be concluded, as the authors of the research state, that the physical education classes greatly affect the total level of physical activity, especially in boys, since the activity of girls is lower. Therefore, Zaza et al. (2005), who was quoted earlier in this paper, rightly recommend to focus all actions aimed at physical activation of youth within a school. Bergier B. et al. (2014) proved the validity of this view.

Another paper chosen by authors Paudel et al. (2014) estimates the level of physical activity and sedentary behaviour of Nepalese youth (n=405) aged 15-20 in their leisure time. Once again it confirms the thesis of greater inclination for sitting life style in girls than in boys. In a research examining physical activity in leisure time (LTPA – Leisure Time Physical Activity), a long version of the IPAQ questionnaire was used. Sedentary behaviour included sitting time spent at school and at home, travelling by various modes of transport, watching TV, playing video/computer games, working at the computer, etc. Out of 405 subjects, 67% showed any form of physical activity in their leisure time for more than 10 minutes without any break. It applied to 80% of boys and 50% of girls.

Among students from Nepalgunj, which demonstrated any form of physical activity in their leisure time, an average time spent on LTPA was 49 minutes a day. It was higher among male students (55 minutes) than among female students (38 minutes). The median MET – minutes/week achieved by students in the area of physical activity in the leisure time was 998, in boys 1314, in girls only 678. The total result of physical activity in leisure time comprised of activities such as walking (45%), then moderate activities (32%) and intense activities (23%). Boys' involvement in the intense activities (28%) was almost two times higher than in girls (14%), whereas in girls the involvement was higher for walking and moderate activities. An average time spent on activities connected with sitting during the day was comparatively higher in girls (they mainly watched TV, met with friends or gossiped) than in boys. The research showed that only two thirds of the teenagers is involved in any form of physical activity in the leisure time. It may be caused by unavailability of parks and playgrounds in Nepal, the situation is even worse due to dangerous roads and hostile urban environment. What is more, children in Nepal are obliged to help their parents at work in agriculture or trade, and girls are responsible for housework, which greatly reduces their free time. As for activities connected with sitting, students spent on such activities on average 7-8 hours a day, whereas national research STEPS Nepal 2013 indicated that 2.5 hours for 15-29 age group is alarming. Students usually spent 4 to 5 hours at school, mostly sitting, what could also contribute to the longer time spent on this activity. It should be remembered that the research was carried out with a use of long version of the IPAQ, in which the question about time spent on sitting takes into account not only ordinary day of the respondent, as in the IPAQ -short version, but also weekend (Marshall, Bauman et al. after: Biernat 2013). Such a lack of distinction can be observed in the research by Paudel et al. (2014). Therefore, a great caution is needed when comparing with each other the results obtained from both versions of the IPAQ – long and short. Bergier J. (2013), referring to the Polish version of the IPAQ questionnaire, proposes to distinguish the time spent in the means of transport from the total time spent on sitting to be able to compare the data from two versions of the IPAQ questionnaire.

Summary:

1. Many previous studies pointed to a decline in physical activity in the period from early adolescence to young adulthood. Also, the analysis of the six global research selected by the authors, which were carried out in various cultural contexts, allows to confirm once again the thesis that the level of physical activity declines with age, both in girls and in boys.
2. Sex differentiated quite significantly undertaking physical efforts in adolescents. Growing up girls are physically less active than boys. The explanation of this phenomenon may be a “movement laziness”, as Woynarowska (2010) calls it, which is especially evident in girls about a time of the first menstruation. According to the author, there is a hypothesis about a natural mechanism which was created during phylogeny and which protects maturing girl from the redundant usage of energy required for the proper development of the reproductive functions. Another negative explanation of lower physical activity in girls can be weaker encouragement for physical effort by family and society. It may be a manifestation of some cultural traditions in a given society and, as such, it would require further sociological research in this direction.
3. Along with an increase in sedentary behaviour among children and teenagers, and its disastrous impact on a health and life in this age group, the research on sedentary lifestyle have become a very important subject of many publications. Girls are still more sedentary than boys. And the current education system promotes activities connected with sitting for a long time of four, five or even more hours. This form of learning together with sedentary lifestyle and inactivity (watching television programmes, playing video/computer

games instead of exercising) lead to a decrease in physical activity during adolescence. It seems there is an urgent need for further research into the understanding of interdependent of sedentary lifestyle. Physical activity in this age group must be supported by actions that would reduce a bad influence which sedentary behaviour has on health.

4. To ensure the reliability and relevance of their research on physical activity, many authors, in addition to a subjective measurement by the IPAQ questionnaire, used also an objective instrument, such as accelerometer or metabolic analyzer. However, it should be remembered that questionnaire is the cheapest method of collecting data on a large number of respondents (national and international research) regardless of their sex, age or health condition (Paffenbarger et al. 1993, Mussino 1999 after: Biernat 2013). It was presented by Booth as real, the only possible test method to use both in the developed countries, such as those shown in this paper, Poland, the Czech Republic, Norway or Spain, as well as in Nepal, China or Brazil, which are still perceived as developing countries².

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² Developing countries according to International Monetary Fund. The list of countries is available at <http://www.imf.org/external/pubs/ft/weo/2009/02/weodata/groups.htm#oem> (accessed: 16.04.2015).

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