

Authors' contributions:

- A** Study design
B Data collection
C Statistical analysis
D Data interpretation
E Literature search
F Manuscript preparation
G Funds collection

Physical activity of youths aged 11 – 15 years in year 2002 in Poland and in other countries

Anna Cabak ^{1, A C D E F}, Barbara Woynarowska ^{2 A B D E G}

Department of Physiotherapy, Academy of Physical Education, Warsaw;
 Department of Biology of Development and Education, Warsaw University, Warsaw

Summary

The aim of the study was to assess physical activity of Polish adolescents classified by gender, age and place of residence, and to confront the results with those recorded in 30 European countries, Israel, Canada and the U.S. within a WHO Collaborative Cross-national Study "Health Behaviour in School-aged Children" (HBSC). A cohort of 6293 of Polish youths from primary (Grade V) and secondary (Grades I and III) schools were studied in 2002 – 2003 by applying an international questionnaire and determining the Moderate-to-Vigorous Physical Activity measure (MVPA), which corresponds to the number of days in a week, on which a subject spends at least 60 min on such activities. The recommended value of that measure is 5 days or more. The study was conducted according to the international study protocol and the results were confronted with those recorded in other countries. Only 35% of Polish youths met the criteria of recommended physical activity (41 and 29% of boys and girls, respectively). That percentage decreased with age, especially for girls. Girls from rural areas exhibited lower physical activity than those from urban areas. No such relation was found for boys. Percentages of youths who attained the recommended level of MVPA measure varied among countries and were highest in the US, Ireland and Canada, and lowest in France, Belgium, Estonia and Norway, Poland occupying an intermediate position. Boys exhibited a higher physical activity than girls in all countries studied.

Key words

Physical activity - Recommended values - Adolescents

Introduction

Physical activity, practised at an appropriate level in the childhood, is known to positively influence the somatic, motor, mental and social development, as well as health of children and youths. It also amplifies chances of continuing physical activities in the future [7]. However, questions as to what volumes and intensities of physical activities should be recommended in various periods of life, and how to measure physical activity, remain unanswered.

Published reports from recent years enabled us to assume that the effects of exertions of moderate intensity are cumulative and, therefore, highly recommendable for adult as well as for young subjects [10]. An example of such an exertion is a rapid walk, accompanied by slightly short breath and a feeling of getting hot. In late nineties, an international expert team recommended

exertions of at least moderate intensity lasting 60 min daily, as optimum for young people [1]. In the US, cumulated moderate-to-vigorous exertions lasting 60 min daily, performed in most days of the week, were accepted as recommended [2]. Similar recommendations for children and youths were accepted in Canada [6].

Determining the level of physical activity in children and youths is not a simple task [11] due to difficulties in designing a simple procedure suitable for monitoring, comparing various populations, as well as for individual assessment. Recently a screening test was proposed by Prochaska, Sallis and Long [8] for use in primary health care. The MVPA (Moderate-to-Vigorous Physical Activity) measure is the number of days, in which the subject spends at least 60 min daily on various physical activities. The minimum recommended level equal to 5 is considered as sufficient to meet the health and developmental needs of young people.

Author's address Dr Anna Cabak, Department of Physiotherapy, Academy of Physical Education, Warsaw 45, Poland
anna.cabak@awf.edu.pl

Financial support The study was supported by grant No. 3P05D 030 22 of the Polish Ministry of Science

The aim of this study was to present and discuss the results of applying the MVPA test to youths aged 11 – 16 years in Poland and in other countries, in relation to gender, age and residence.

Material and Methods

Study structure and subjects

The study was conducted from October 2001 to June 2002 (in Poland – in February and March 2002) as part of an international HBSC project (Health Behaviour in School-Aged Children: a WHO Collaborative Cross-National Study), conducted in collaboration with European Regional Bureau of WHO¹. The study was conducted on representative cohorts of youths from 31 European countries (including Poland), in Israel, Canada and US, aged 11 – 16 years, selected according to an international study protocol [3]. Total number of subjects, whose physical activity data were analysed, was 151 811.

Polish cohort of youths from primary (Grade V) and secondary (Grades I and III) schools, urban or rural, was selected by a two-stage group randomisation. In the first stage, 48 out of 368 districts were randomised (2 – 4 districts from every region). In the second stage, appropriate number of school forms was randomised from the list. Details of the procedure were reported elsewhere [13]. Mean ages of groups of youths were 11.7, 13.7 and 15.7 years. Total number of subjects was 6293, their distribution by gender, age and residence is presented in Table 1.

The questionnaire technique used in the study was applied by specially selected and trained personnel supervised by regional co-ordinators (for details see [13]).

Methods

An international standardised questionnaire, designed in 2001 by Focus Groups consisting of researchers representing all teams participating in HBSC project, was used in the study. The questions pertained to health behaviours, including physical activity, in relation to family, school and playmate environments. The questionnaire was verified in pilot studies in many countries, and the approved research procedures enable comparing the results internationally [3].

Questions pertaining to physical activity and sedentary leisure behaviours were designed by Physical Activity Team headed by Ch.Roberts² [5]. A screening test proposed by Prochaska, Sallis and Long [8] for use in primary health care was used in the last phase of the project. The MPVA measure was determined from the following two questions with accompanying explanation:

Physical activity includes all activities associated with physical exercise and movements, when you breathe faster and your heart beats faster. You are physically active at physical education classes at school, when you practise sports, play with your mates, go to school. Running, fast walking, swimming, cycling, skateboarding, skating, playing volleyball or football, are examples of physical activities.

When answering the following two questions, estimate how much time you were physically active every day, i.e. sum up the time you spent on all such activities.

*During the last 7 days, on how many days did you do physical activities (**including PE classes**) for at least 60 min (total time) a day?*

0 1 2 3 4 5 6 7 days

*In a typical, or ordinary week, on how many days did you do physical activities (**including PE classes**) for at least 60 min (total time) a day?*

0 1 2 3 4 5 6 7 days

The original version of Prochaska et al. [8] was modified by adding “physical education classes” (bolded). Chi-square function and ANOVA were used in data analysis, the level of $p \leq 0.05$ being considered significant.

Results

Physical activity of Polish youths

Percentages of population categories (gender, age, residence) declaring given numbers of days in a week spent on physical activity, and mean values of MVPA, are presented in Table 1.

Mean MVPA was significantly ($p < 0.001$) higher in boys than in girls (4.3 and 3.8 days, respectively), which was due to significantly lower percentage of boys, compared with girls, practising physical activities up to 4.5 days a week, and significantly higher – at the recommended level, i.e. 5 or more days a week (all $p < 0.001$). Place of residence (urban or rural) had no effect on mean MVPA. On the other hand, MVPA decreased with age, significantly ($p < 0.001$) more in girls than in boys.

¹ The international co-ordinator of the HBSC study was Dr C.Currie from Edinburgh University (Scotland), the head of the International Data Bank was Dr O.Samdal from Bergen University (Norway). In Poland, the study was co-ordinated by one of us (B.W.).

² One of us (B.W.) was a member of this team

Table 1. Mean values (\pm SD) of Moderate-to-Vigorous Physical Activity (MVPA) recorded in various categories of Polish youths in 2002 and percentages of subjects classified by numbers of days in a week spent on moderate-to-vigorous physical activities

	n	Mean MVPA	Numbers of MVPA days			
			0	0.5 - 2.5	3.0 - 4.5	5.0 - 7.0
Total	6293	4.0 \pm 1.8	1.7	22.3	40.7	35.3
Boys	3151	4.3 \pm 1.9	1.5	18.7	38.6	41.2
Girls	3142	3.8 \pm 1.8***	1.9	26.0***	42.7***	29.4***
Residence						
Boys						
Urban	1996	4.2 \pm 1.8	1.6	17.5	39.6	41.3
Rural	1155	4.3 \pm 1.9	1.4	20.7	36.9	41.0
Girls						
Urban	1928	3.9 \pm 1.8	2.0	25.0	41.0	32.0***
Rural	1214	3.7 \pm 1.7	1.7	27.1	45.1	26.0***
Age (years)						
Boys						
11	1053	4.5 \pm 1.8	1.0	16.5	37.9	44.5
13	1070	4.2 \pm 1.8	1.4	18.8	39.5	40.3
15	1028	4.1 \pm 1.9	2.1	20.8	38.4	38.6
Girls						
11	1003	4.2 \pm 1.8	1.6	18.1	41.2	39.1*
13	1030	3.8 \pm 1.7	2.1	24.5	45.9	27.5***
15	1109	3.4 \pm 1.7	1.9	34.5***	41.1	22.5***

Significantly different from boys: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Bolded value: significantly ($p < 0.001$) different from the corresponding urban one.

Percentages of youths, classified by gender and place of residence, whose physical activity meets the recommended MVPA level, are presented in Fig. 1, and of those classified by gender and age – in Fig. 2. Those percentages are higher in boys than in girls in all age

categories but significantly decrease with age both in boys ($p < 0.01$) and in girls ($p < 0.001$). Moreover, no significant residence-dependent difference was found in boys, while significantly ($p < 0.001$) more urban girls meet the recommended criterion compared with the rural ones.

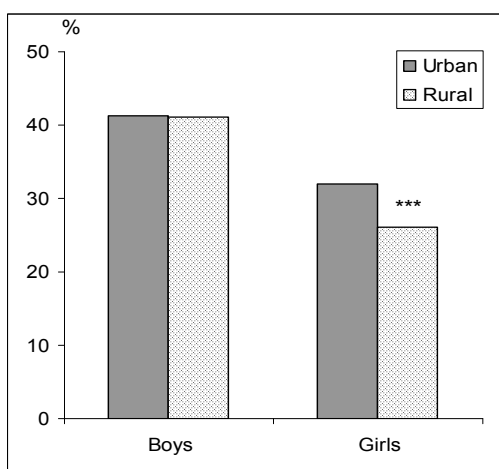


Fig. 1. Percentages of Polish boys and girls aged 11 – 15 years, classified by residence, whose Moderate-to-Vigorous Physical Activity measure (MVPA) attained the recommended level of at least 5 days a week

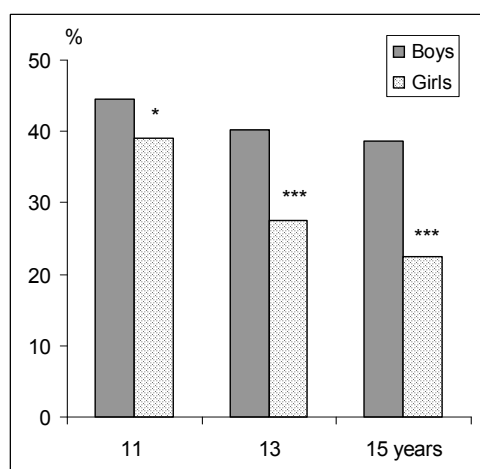


Fig. 2. Percentages of Polish boys and girls aged 11 – 15 years, classified by age, whose Moderate-to-Vigorous Physical Activity (MVPA) attained the recommended level of at least 5 days a week

Physical activity of youths from various countries

Mean MVPA for all 34 countries ranged from 3.4 (Belgium) to 4.9 (Ireland) days a week in boys and from 2.7 (France) to 4.1 (Canada) days a week in girls. Overall mean for Poland amounted to 4.0 days and was slightly higher from that for all 34 countries combined (3.8 days).

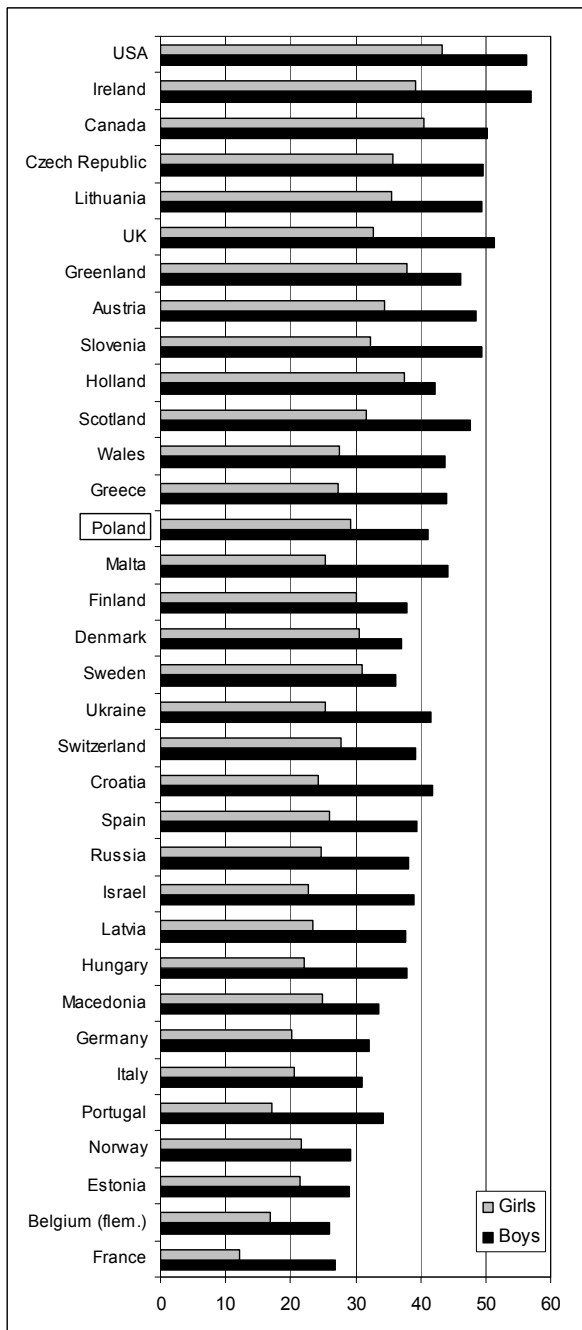


Fig. 3. Percentages of boys and girls from various countries, aged 11 – 15 years, participating in the HBSC study in 2001 – 2002, whose Moderate-to-Vigorous Physical Activity (MVPA) attained the recommended level of at least 5 days a week

Percentages of boys and girls from various countries who attained the recommended MVPA are presented in Fig. 3. Highest percentages of youths declaring 5 or more days of MVPA were reported for the US, Ireland and Canada (over 50% of boys and about 40% of girls), and lowest in France, Belgium, Estonia and Norway (about 30% of boys and 12 – 22% of girls).

Physical activity of girls was in all countries lower than that of boys, the gender-related differences being small in Scandinavian countries (Sweden, Denmark, Finland), and higher in e.g. France and Portugal.

Discussion

The criterion of sufficient physical activity of adolescents, defined by Moderate-to-Vigorous Physical Activity measure (MVPA) equal to at least 5 days a week, at least 60 min daily, was applied together with a questionnaire screening test [8] to youths in Poland and 30 other European countries, and in Israel, Canada and the U.S. That test enabled discerning those who did not meet the abovementioned criterion and, therefore, were considered at risk of developing diverse health disorders associated with motor activity deficiency. In Poland, only 41.2% of boys and 29.4% of girls aged 11 – 15 years met the recommended level of physical activity, while in about 20% of boys and 25% of girls the MVPA was very low, not exceeding 2.5 days a week. These adolescents represented the increased risk groups.

An overview of results noted in 34 countries shows that motor activity deficiency of adolescents is quite common nowadays, albeit to a varying degree. Percentages of youths who attained the recommended level of MVPA ranged in boys and girls from 56.9% in Ireland to 26.0% in Flemish Belgium, and from 43.4% in US to 12.1% in France, respectively. Those data should be inspected with care since they could have been affected by the broad season (October – June). In Ireland, where the percentage of “active” adolescents was highest, the study was conducted in the period from April till June, while in the U.S. in November and December, and in Canada in January and February. Thus, in order to make the results comparable, the studies should be conducted in the same season.

Irrespective of the technique of determining physical activity, girls exhibit much lower activity than boys, as reported by many authors from various countries including Poland [4,14,15], that gender-related difference being smallest in Scandinavian countries. Another disquieting fact is a gradual decrease of physical activity with age [1,13,16], which in Poland is more emphasised

in girls than in boys. Only about 40% of Polish girls aged 11 years met the recommended MVPA, and that percentage dropped down to 22.5% in 15-year old girls. That age-related decrease was reported for other countries as well [9]. Moreover, less Polish girls from rural areas attain the recommended MVPA level than from urban areas (26 and 32%, respectively). No such relation was found in this study for boys in contrast to an earlier HBSC study [12]. Considering all those facts, the intermediate position occupied by Poland in relation to other countries should not be regarded as satisfactory. The presented results should prompt for undertaking steps towards promoting active life styles, i.e. various physical activities among youths by making available health education and motor activity facilities. Such steps are indispensable to prevent youths from sedentary forms of leisure, especially associated with a wide use of computers. Promotion of active life styles should be accompanied by steady monitoring of those activities in youths and by steady perfection of monitoring techniques. It seems that the HBSC method may serve as a useful tool for that purpose owing to its simplicity. Moreover, there is a need to follow other countries in establishing the recommended levels of physical activity designed for various age groups of Polish population.

Summary and Conclusions

Only about one-third of Polish teenagers aged 11 – 15 years engage in moderate-to-vigorous physical activities for at least one hour daily, at least 5 days a week. Furthermore, about one-fifth of male and one-fourth of female adolescents are in the increased risk category because of exceedingly low physical activity. Since the percentages of youths from that risk category increase with age, efficient ways should be sought to motivate children, especially from secondary schools, to re-orient their life style.

Insufficient physical activity of young people is widely spread in many a country despite notable differences between countries. Among the 34 countries studied, Poland occupies an intermediate position, which calls for intensifying efforts directed at persuading young people to engage in motor activities.

Measuring the Moderate-to-Vigorous Physical Activity (MVPA) is simple and efficient, and should be recommended as a tool in large-scale screening as well as in individual counseling. Recommendations pertaining to health-directed physical activities should be formulated by experts and widely spread in Poland.

References

1. Biddle S., J.Sallis, N.Cavill (eds.) (1998) Young and active? Young people and health-enhancing physical activity – evidence and implication. Health Education Authority, London
2. Council for Physical Education for Children (1998) Physical activity for children: a statement of guidelines. National Association for Sport and Physical Education, Reston
3. Currie C, O.Samdal, W.Boyce, B.Smith (2001) Health Behaviour in School-Aged Children: a World Health Organization Cross-National Study. Research protocol for the 2001/02 survey. University of Edinburgh
4. Drabik J. (1997) Promocja aktywności fizycznej. Part III. Academy of Physical Education, Gdańsk
5. Due P., M.Hickman, A.Komkov *et al.* (2001) Focus area rationale: Physical activity. In: C.Currie, O.Samdal, W.Boyce, B.Smith (eds.) Health Behaviour in School-Aged Children: a World Health Organization Cross-National Study. Research protocol for the 2001/02 survey. University of Edinburgh, pp.59-70
6. Handbook for Canada's physical activity guide to healthy active living. Health Canada, Canadian Society for Exercise Physiology, www.healthcanada.ca/paguide
7. Malina R. (1996) Tracking of physical fitness across the lifespan. *Res.Q.Exerc.Sport*, 67:(suppl. 3):S1-S10
8. Prochaska J.J., J.F.Sallis, B.Long (2001) A physical activity screening measure for use with adolescents in primary care. *Arch.Pediatr.Adolesc.Med.* 155:554-559
9. Roberts Ch., J.Tynjala, A.Komkov (2004) Physical activity. In: C.Currie, Ch.Roberts, A.Morgan, et al. (eds.) Young people's health in context. International Report from the 2001/02 survey (in press)
10. US Department of Health and Human Services (1996) Physical activity and health: A report of the Surgeon General. Washington, DC. US Dep. of Health and Human Services
11. Welk G., C.B.Corbin, D.Dale (2000) Measurement issues in the assessment of physical activity in children. *Res.Q.Exerc.Sport*, 71(2):59-73.
12. Woynarowska B., M.Jodkowska, A.Oblacińska (2000) Samoocena sprawności i aktywności fizycznej w czasie wolnym u młodzieży szkolnej w latach 1994-1998. *Pediatr.Pol.* 75:35-41
13. Woynarowska B., J.Mazur (2002) Zachowania zdrowotne, zdrowie i postrzeganie szkoły przez młodzież w Polsce w 2002 r. Raport techniczny z badań. Wydział Pedagogiczny Uniwersytet Warszawski, Warszawa
14. Woynarowska B., J.Mazur (1999) Zachowania zdrowotne i samoocena zdrowia. Raport z badań wykonanych w 1998 r. Wydział Pedagogiczny UW, Warszawa
15. Young people and physical activity (1997) A literature review. Health Education Authority, London

Acknowledgements

Thanks are due to the following researchers for making available their HBSC data from years 2001 – 2002: A.Aszmann (Hungary), O.Balakireva (Ukraine), W.Boyce (Canada), F.Cavallo (Italy), L.Csemy (Czech Republic), C.Currie (Scotland), P.Due (Denmark), W.Dür (Austria), M.Gaspar De Matos (Portugal), E.Godeau (France), Y.Harel (Israel), K.Hurrelmann (Germany), A.Kokkevi (Greece), A.Komkov (Russia), L.Kostarova Unkovska (Macedonia), M.Kuzman (Croatia),

L.Maes (Belgium, Flemish), U.Marklund (Sweden), M.Maser (Estonia), M.Massa (Malta), M.Moreno (Spain), A.Morgan (UK), S.Nic Gabhainn (Ireland), M.Overpeck (USA), J.M.Pedersen (Greenland), I.Ranka (Latvia), Ch.Roberts (Wales), O.Samdal (Norway), H.Schmid (Switzerland), E.Stergar (Slovenia), J.Tynjälä (Finland), W.Vollebergh (Netherlands), A.Zaborskis (Lithuania).

Received: 12.03.2004

Accepted for publication: 25.06.2004