УДК 37.037

THE PHYSICAL ACTIVITY OF GYMNASIUM AND SECONDARY EDUCATION TEACHERS

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Abstract

Despite a noticeable increase in health awareness of active participation in physical culture, the vast majority of society still does not see a dependency between health and physical activeness. Only a few consider the lack of movement as one of the most harmful factors. Many researches, both Polish and foreign, point to insufficient level of physical activeness among citizens of the European Union, also including Polish ones. The report was aimed at determining the level of declared physical activity of gymnasium and secondary education teachers from Bialski region. In addition, an attempt was made to assess the impact of such variables as sex and subject taught on the level of respondents' physical activeness. There was applied a method of diagnostic survey using an IPAQ questionnaire (International Physical Activity Questionnaire) – short version, last 7 days. The research material consisted of 221 randomly selected gymnasium and secondary school teachers from Bialski region. Due to the subject taught, respondents were divided into two groups: physical education teachers (n=76) and teachers of other subjects (n=145). The largest percentage of groups surveyed consisted of people who had a sufficient level of physical activity, whilst the one third met the criteria of the high level. Only physical activeness of moderate nature significantly differentiated groups surveyed in favour of physical education teachers. Taking sex as a criterion of division of the population surveyed, among the women, a considerable differentiation appeared in the area of walking, whereas the male population did not show significant differences only in the area of intense activity.

Key words: teachers, physical activeness, health.

Анджей Сорока, Джоанна Бай-Корпак. Фізична активність учителів середніх шкіл та гімназій. Незважаючи на значне збільшення інформованості про вплив фізичної культури на здоров'я, основна частина суспільства все ще не бачить залежності між здоров'ям і фізичною активністю. Мало хто розуміє, що гіподинамія є одним із найбільш небезпечних факторів. Багато польських і зарубіжних дослідників указують на недостатній рівень фізичної активності в громадян Євросоюзу, у тому числі й у поляків. ***Мета дослідження*** – визначити номінальний рівень фізичної активності вчителів середніх шкіл та гімназій, які працюють у Бяльському районі. Крім того, ми спробували оцінити вплив таких чинників, як стать і предмет викладання, на рівень фізичної активності респондента. Для проведення анкетування використано опитувальник IPAQ (Міжнародний опитувальник із фізичної активності) – короткий варіант, тривалість – сім днів. Дослідження проводили на 221 учителю середніх шкіл і гімназій Бяльського району, яких обрано випадковим чином. Ґрунтуючись на предметах, котрі вони викладають, респондентів поділено на дві групи: учителі фізкультури (n = 76) та педагоги, які викладають інші предмети (n = 145). Виявлено, що люди, котрі мають достатню фізичну активність, складають найбільший відсоток у групах, тоді як лише в 1/3 респондентів відзначено високий рівень активності. При використанні гендерної приналежності як критерію, за яким респондентів поділяли на групи, можна відзначити, що серед жінок істотні відмінності виявлено під час занять ходьбою, тоді як у чоловічій групі достовірних відмінностей не виявлено тільки при інтенсивних тренуваннях.

Ключові слова: учителі, фізична активність, здоров'я.

Анджей Сорока, Джоанна Бай-Корпак. Физическая активность учителей средних школ и гимназий. Несмотря на значительное увеличение информированности о влиянии физической культуры на здоровье, основная часть общества все еще не видит зависимости между здоровьем и физической активностью. Только немногие понимают, что гиподинамия является одним из наиболее опасных факторов. Многие польские и зарубежные исследователи, указывают на недостаточный уровень физической активности у граждан Евросоюза, в том числе и у поляков. ***Цель исследования*** – определить номинальный уровень физической активности учителей средних школ и гимназий, которые работают в Бяльском районе. Кроме того, мы попытались оценить влияние таких факторов, как пол и предмет преподавания, на уровень физической активности респондента. Для проведения анкетирования использован опросник IPAQ (Международный опросник по физической активности) – короткий вариант, длительность – семь дней. Исследование проводили на 221 учителе средних школ и гимназий Бяльского района, которых выбрали случайным образом. Исходя из предметов, которые они преподают, респондентов поделили на две группы: учителя физкультуры (n=76) и учителя, которые преподают другие предметы (n=145). Выявлено, что люди, имеющие достаточную физическую активность, составляют наибольший процент в группах, тогда как лишь у 1/3 респондентов отмечается высокий уровень активности. При использовании гендерной принадлежности как критерия, по которому респондентов разделяли на группы,

можно отметить, что среди женщин существенные различия выявлены при занятиях ходьбой, тогда как в мужской группе достоверные различия не выявлены только при интенсивных тренировках.

Ключевые слова: учителя, физическая активность, здоровье.

Introduction. Systematically undertaken physical activity, which is an individual's indicator of health culture and health responsibility, determines a proper development of organism as well as prevents from degenerative changes and diseases of civilisation [1; 12]. A rationale for active participation in physical culture seems to be almost obvious – it results from an extremely important role of activity in achieving and improving health potential of a human.

A lifestyle has an influence on our health in about 50 % [20]. Its basis is the physical activeness which has a positive effect on the improvement of morphofunctional indicators and others related to physical fitness and efficiency as well as on the mental condition of an individual.

Defining physical activity as any body movements associated with the work of skeletal muscles, causing an increase of energy expenditure above the level of basic metabolism [8], we represent the view that any kind of effort involving locomotor system has a positive effect on human body.

Due to the role of physical activity, its measurement becomes an aware challenge for scientists from all over the world. Determination of the level of society's physical activeness helps to assess public health. However, there is no compatible position on the minimal physical effort. According to some authors, it is an effort which does not exceed 4–5 units on MET scale (Metabolic Equivalent of Task), and at the same time does not cause the additional expenditure of energy 500 kcal/week [10]. Others, the insufficient physical activity define as the energy expenditure associated with physical activity less than 10 % of total 24-hour energy expenditure [18]. According to recommendations of FAO / WHO / UNU in 2004, the minimum physical effort is specified with the PAL factor (Physical Activity Level) not less than 1,4 [16].

The development of methods and techniques for measuring physical activity is a priority in the field of physical education studies [19]. The precise measurement allows to accurately estimate health benefits of undertaking regular physical activity and to build appropriate programs promoting healthy lifestyle.

The basis of the overall structure of physical culture is physical education whose primary purpose is to raise the physical fitness to a higher level, stimulate physical development and to shape attitudes related to personal concern for the physical condition, physical fitness, beauty and health [3]. In view of the fact that the physical education mainly refers to children and adolescents, the role of a teacher in this field seems to be considerable. According to the authors, particularly important is the attitude of a physical education teacher – in his proceedings should not appear contradictions between what he orders and what he represents. His personality often plays a considerable role in raising awareness of his pupils about the benefits of regular physical activity, thus having an influence on their interest in movement.

Materials and methods of the study. Research material consisted of 77 randomly selected teachers of Bialskie gymnasium and high schools. Respondents were divided into two groups. The first one were physical education teachers (n = 39), of whom 26 respondents were women and 13 men. The second group consisted of 38 teachers involved in subjects other than physical education. Three–quarters of this group were women (n = 29) and 23 % were men (n = 9). Both, the physical education teachers and teachers of other subjects had similar somatic parameters within the sex. However, it should be noted that men in the group of physical education teachers only minimally had the average results of weight–growth parameters in the range of normal body build (24,6 ± 2,2 kg/m^2). The average value of BMI rate in the group of teachers of other subjects was 26,0 ± 2,9 kg/m^2 indicating the access weight among men (tab. 1).

Table 1

Characteristics of Studied Groups of Teachers

Variables	**Groups of teachers**			
	Group of Physical **Education Teachers**		**Group of Other Teachers**	
	Women (n=26)	**Men (n=13)**	**Women (n=29)**	**Men (n=9)**
Body mass (kg)	61,8±6,9	77,6±11,8	60,1±7,9	82,3±9,5
Body height (cm)	163±5,6	177,2±5,6	166,2±4,5	177,7±5,4
BMI (kg/m^2)	22,8±2,7*	24,6±2,2*	21,7±2,6*	26,0±2,9**

* proper body mass (18,5–24,9 kg/m^2).

** excess weight (25,0–29,9 kg/m^2).

The body mass index (BMI), used for this purpose, is the result of the dependency between body mass expressed in kilogr-ams and body height expressed in meters squared. The higher value of the BMI indicator, the greater body mass. The values of this ratio below 18,5 indicate the underweight, the range 18,5–24,9 is the normal weight, 25,0–29,9 is overweight, while the BMI above 30.0 indicates obesity [17]. Due to the small number of teachers qualified as obese, calculations include three ranges that specify body build i.e. underweight, normal body build and overweight.

Weight-growth parameters calculated in the form of BMI indicator showed a similar structure in both studied groups of teachers. More than 70 % of respondents had normal body build. Similar percentages were also observed in individual groups: 76,9 % among physical education teachers and 71,1 % among teachers of other subjects. On average, every fourth teacher was overweight. Comparing groups surveyed, a greater percentage of respondents had the BMI indicator at the level of 25,0 kg/m2 than teachers of other subjects (26,3 %). In the group of PE teachers, the overweight teachers constituted 20,5 % of all respondents. Taking into account the sex of respondents, it was stated that the highest percentage of overweight respondents were men who taught other subjects than physical education (77,8 %). It seemed striking that more overweight women were among PE teachers (15,4 %) (5,1 % more than among women teaching other subjects) (fig.1.).

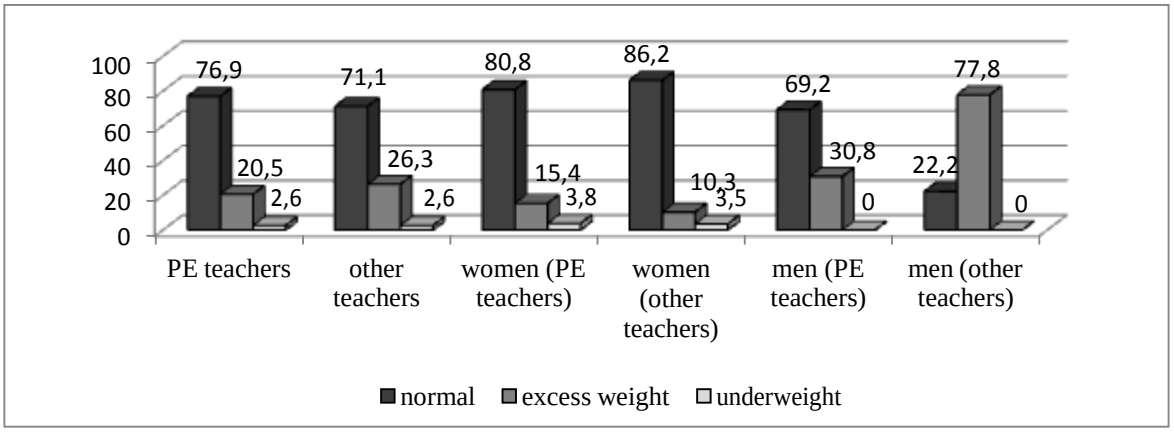

Fig. 1. *Weight*-growth *Parameters of Physical Education Teachers and Teachers of Other Subjects Specifying the Sex of Respondents*

There was applied a method of diagnostic survey using an IPAQ questionnaire (International Physical Activity Questionnaire) – short version, last 7 days, which is especially recommended in the assessment of the level of physical activity of the whole population [6]. This questionnaire is regarded as one of the most widely used survey tools to monitor physical activity.

In the questionnaire are collected information about the amount of time spent on the intensive and moderate exercise as well as on walking, considering all areas of human life. Taken into account are only activities lasting at least 10 minutes and performed in a continuous manner. The physical activity was defined, according to the IPAQ methodology, as a heavy effort that forces to increased respiration and to rapid heartbeat such as aerobics, fast cycling, lifting heavy loads, digging the earth. Moderate physical activity amounts to activities that require the average effort with slightly increased respiration and slightly accelerated heart rate.

A total energy expenditure was calculated on the basis of multiplying the frequency and duration of physical activity by the corresponding intensity expressed in units of MET. A metabolic equivalent of 1 MET corresponds to O_2 consumption at rest and amounts to 3,5 ml O_2/kg of body weight per minute [4].

A question on the self-esteem of physical activity level found its place in specifications. Respondents had a choice of three answers: a high level of physical activity, a satisfactory level of physical activity and physical activity at an unsatisfactory level.

The obtained results were analyzed statistically using Statistica program. There was used a location measure in the form of the arithmetic mean and the measure of variability using the standard deviation. As some analyzed variables did not meet assumptions of parametric test application due to the lack of normal distribution and the lack of equality of variance, the U Mann–Whitney test was used. Differentiations were defined as statistically significant at $p < 0.05$.

Discussion and the results of the study. The analysis of the value of MET – min/week indicator within the overall physical activity showed higher average values in the group of physical education teachers. This ratio reached 4344,1 MET – min/week comparing to 3936,8 MET – min/week of teachers of other subjects. The highest differentiations were found within the moderate nature of physical efforts. It was significantly

higher (p = 0,047) between physical education teachers (1057,4 MET – min/week) and teachers of other subjects (580,0 1057,4 MET – min/week). A group of physical culture specialists had higher values of MET –min/week (without any evidence of significant differences) in the field of activity of intensive nature (1491,21272,6 MET – min/week) in relation to teachers of other subjects (1272,6 MET – min/week). However, pedagogues of other subjects showed higher activity in walking which in their case reached 2084,2 MET – min/week comparing to 1795,5 MET – min/week of physical education teachers (tab. 2, fig. 2).

Table 2

Physical Activity of Groups of Surveyed Teachers (the U Mann-Whitney Test)

Type of Physical Activity	PE Teachers		Other Teachers		U Test Value	Precise, p
	Rank Sum	N	Rank Sum	N		
Intensive	1563,0	39	1440,0	38	0,427	0,665
Moderate	1790,0	39	1313,0	38	1,921	0,047*
Walking	1316,0	39	1581,0	38	–1,013	0,306
Total activity	1565,0	39	1438,0	38	0,448	0,653

* level of essentiality p<0,05.

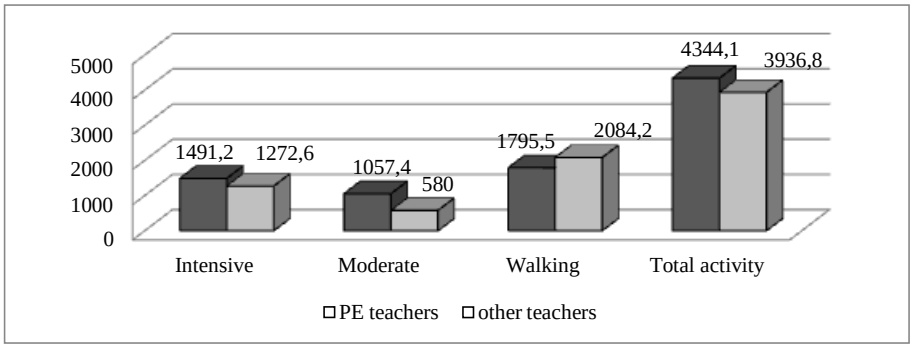

Fig. 2. *Average Physical activity of Groups Surveyed Including the Type of Activity (MET-min/week)*

Studying physical activity of particular groups of teachers with sex taken into account, slightly higher activity was demonstrated by female teachers of other subjects than of physical education ones. The average activity in this group reached 4029,0 MET – min/week comparing to 3951,5 MET – min/week of the group of physical education teachers. The greatest significant differentiation (p=0,049) in favour of female teachers of other subjects appeared in walking which was respectively: 2282,1 MET – min/week and 1729,9 MET – min/week of female physical education teachers. In areas of intensive and moderate physical efforts, female PE teachers reached higher values. However, differentiations were not substantial and did not have signs of statistically significant differences (tab. 3, fig. 3).

Table 3

Physical Activity of Groups of Female Teachers (U Mann–Whitney Test)

Type of Physical Activity	PE Teachers		Other Teachers		U Test Value	Precise p
	Rank Sum	N	Rank Sum	N		
Intensive	774,5	26	795,5	29	0,278	0,780
Moderate	778,5	26	761,5	29	0,851	0,394
Walking	637,5	26	902,5	29	–1,926	0,049*
Total activity	703,5	26	838,0	29	–0,413	0,679

* level of essentiality p<0,05.

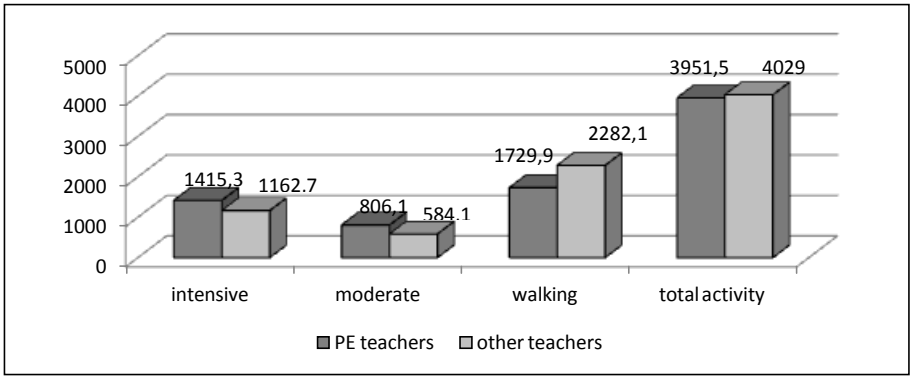

Fig. 3. *Moderate Physical Activity of Women From the Groups of Teachers Considering the Type of Physical Activity (MET–min/week)*

A different situation occurred between two groups of male teachers. In a significant way (p=0,039), physical education teachers presented higher activeness. The average activity in this group was 5129,7 MET–min/week, comparing to 3639,8 MET–min/week of teachers who teach other subjects. In the area of moderate activity, physical education male teachers also showed higher values of essential features (p=0,031) obtaining an average at the level of 1560,0 MET – min/week, comparing to 566,6 MET-min/week of teachers who teach other subjects. A similar dependency was found within the walking (p=0,046), where the activity of PE teachers was 1926,6 MET-min/week, comparing to 1446,5 MET-min/week of teachers of other subjects. The activity of intensive nature in both groups had very similar levels (tab. 4, fig. 4).

Table 4

Physical Activity of Men From Groups of Teachers Surveyed (U Mann–Whitney Test)

Type of Physical Activity	PE teachers		Other teachers		U test Value	Precise p
	Rank Sum	N	rank sum	N		
Intensive	149,5	13	103,5	9	1,124	0,321
Moderate	173,5	13	79,5	9	2,234	0,031*
Walking	160,5	13	92,5	9	1,831	0,046*
Total activity	169,5	13	83,5	9	1,983	0,039*

* level of essentiality p<0,05.

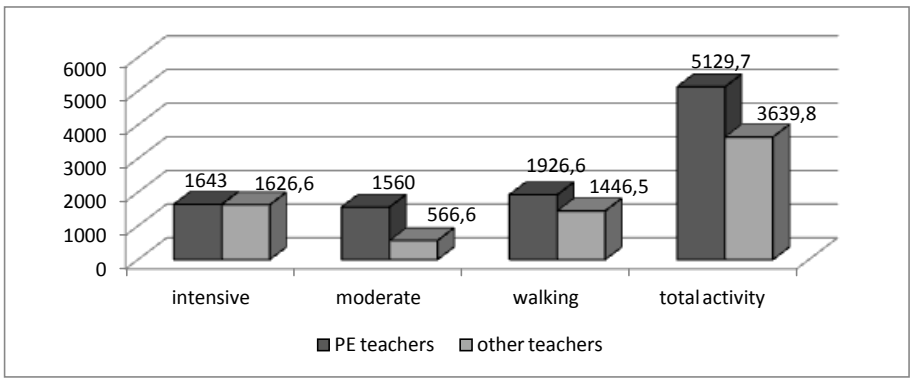

Fig. 4. *Average Physical Activity of Men From Groups of Teachers Surveyed Considering the Type of Activity (MET-min/week)*

Specifying the structure of physical activity, it was shown that 47,6 % of teachers of other subjects than physical education had high physical activity. The group of physical education teachers constituted 25,6 %. In the area of moderate activity, a higher percentage of respondents were pedagogues teaching physical education (59,0 %), whereas a percentage of teachers of other subjects constituted 36,8 % of respondents. Respondents with insufficient physical activity in both groups constituted a similar percentage – respectively, 15,4 % of physical education teachers and 15,8 % of teachers of other subjects. Worth noting is the fact that among women–teachers of other subjects, a group of respondents of high activity was proportionately greater (44,8 %) than a group of physical education teachers (19,2 %). These last mentioned in 65,4 % were characterised with activity known as sufficient, comparing to 44,9 % of ladies from the group of teachers of other subjects. Among men, every third pedagogue (33,3 %) teaching other subjects than physical education had the insufficient level of physical activity. In the group of physical education teachers, the percentage of individuals with the insufficient level of physical activity reached only 15,4 %. Most of respondents in this group met the requirements for the insufficient level of physical activeness (46,1 %), whereas the high level applied to 38,5 % of PE teachers surveyed. In the group of pedagogues teaching other subjects, the percentage of the physical active at the highest level was 55,6 %, while those presenting the physical activeness at the sufficient level 11,1 % (fig. 5).

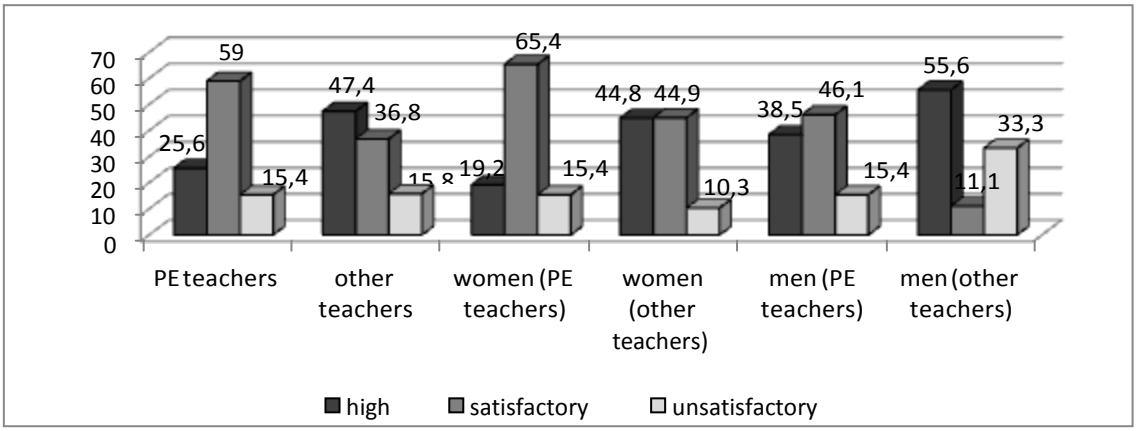

Fig. 5. *The Level of Physical Activity of PE Teachers and Teachers of Other Subjects Specifying the Sex of the Surveyed*

The study of self-assessment of the level of teachers' physical activity showed that 94,9 % of physical education teachers defined their physical activeness as satisfactory, the remaining 5,1 % defined it as high. In the group of physical education teachers, 100 % of women teaching physical education considered their level of physical activity as satisfactory, while among men this percentage was 84,6 %. The remaining respondents defined their activeness as high. Among pedagogues teaching other subjects than physical education, the group of respondents defining their physical activity as high constituted 13,2%, as satisfactory 63,2 %, whereas as unsatisfactory 23,6 %. Taking into account the sex of teachers, it was stated that the highest percentage of men defined their level of physical activity as satisfactory (44,4 %), 33,4 % as unsatisfactory and 22,2 % as high. The majority of female teachers of other subjects than physical education defined their physical activity at the satisfactory level (68,9 %). Only 10,3 % of women in this group defined their activity as high, while 20,8 % are dissatisfied with their levels (fig. 6).

Regular physical activity is regarded as an effective means of promoting physical and mental health [9]. A positive correlation has been proven between physical activity and mood improvement, better self–perception and higher self–esteem [15]. Physical activity also decreases depression and anxiety [11].

A confirmation of the validity of physical activity is undoubtedly the fact of placing it in the National Health Program (1996–2005) in the first place among eighteen operational aims of the writing to increase the physical activity of the whole population [13].

According to the report from 2009 about the health of Polish people and their physical activity in comparison to the European Union countries, we still are not a population intensively and systematically participating in recreational physical activity. The physical activity of Polish people is considered very low and unsatisfactory. This phenomenon is even more disturbing due to the fact that its level is a positive measure of health [7].

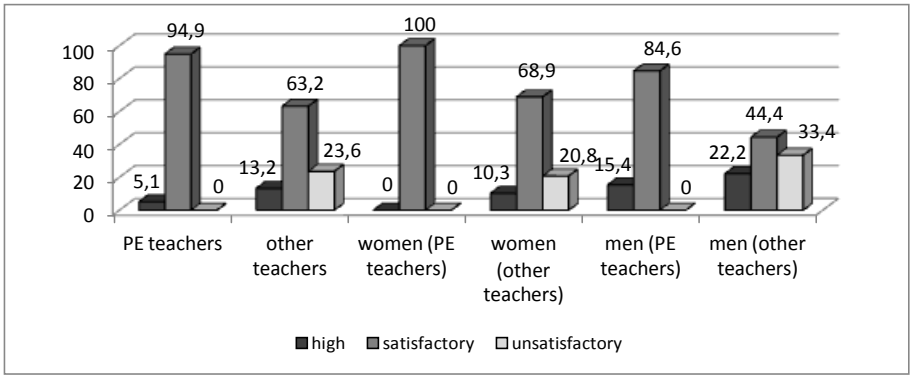

Fig. 6. *Self-esteem of Physical Activity Level of PE Teachers and Teachers of Other Subjects Considering the Sex of Respondents*

In the literature there are many publications related to the physical activity of various socio-professional groups. Unfortunately, most of them only refers to the activity undertaken in leisure time. Additionally, problematic seems to be a comparison of research results conducted with various research tools.

The authors of this paper used a short version of the International Physical Activity Questionnaire (IPAQ), particularly recommended to assess the level of physical activity of a large population [6]. Piątkowska [14] emphasizes that it shows physical activity as the overall picture and not just as the participation in sports and recreational activities like many other studies carried out in Poland.

The results presented in this report show significant differences in the level of total physical activity among physical education teachers and teachers of other subjects. The percentage of highly active teachers ranged from 19 % in the case of women teaching physical education to 55 % in the group of teachers of other subjects. Comparing the above data with those obtained in 2009, in which the research material also consisted of respondents associated with bialska education, a decline appeared in the percentage of the most active from 40 to 31 % [2].

The analysis of the literature shows that the level of physical activity decreases with the age [7]. This process begins in the early years of schooling. In addition, regardless of the age category, women have lower physical activity than men. Meanwhile, the highest percentage of respondents who do not meet the criteria of sufficient level is reported within a group of men (fig. 5).

It would seem that specialists in the field of physical culture should have a proportionately higher physical activity than teachers of other subjects. However MET-min/week values show only 4 % difference. In this case, it somehow contradicts the statement that physical activeness associated with professional work plays a dominant role [2].

The authors of report joined to the questionnaire survey a question on self–esteem of physical activity level. A comparative analysis of the facts of made self–esteem showed significant discrepancies. The vast majority of physical education teachers (95 %) were satisfied with their level of physical activity. Meanwhile, according to the IPAQ criteria for a sufficient level, only 59 % of them complied with the standards. Similar proportions were observed in the case of teachers of other subjects – self-esteem at satisfactory level was higher than that of the facts by more than 26 % (fig. 5, fig. 6). It was worrying that over 15 % of respondents from both groups did not meet the criteria for an acceptable level of physical activity. These results indicate a need to raise public awareness of the positive values of active recreation and to implement programs promoting healthy lifestyle. It should be remembered that the correct estimation of the level of physical activity, the identification of its conditioning factors as well as causes of diversification are not just important but absolutely essential [14].

Conclusions. The analysis of the physical activity declared by respondents helped to formulate the following conclusions:

1. The highest percentage of the group surveyed consisted of people having a sufficient level of physical activity and almost one in seven respondents did not have a sufficient activity.

2. Statistically significant differences in the size of the index MET–min/week between physical education teachers and teachers of other subjects were found in the area of moderate physical activity.

3. Taking gender as a criterion of division of group surveyed, it was showed that in women's group significant differences were found only within the walking, while in men's group statistically significant differences did not only appear in the area of intense activity.

4. The level of physical activity of teachers surveyed based on the criteria defined in accordance with the IPAQ methodology was not adequate with the self–esteem of respondents.

Literature

1. Anuszewska-Mastalerz K. Aktywność fizyczna jako czynnik zdrowotnego stylu życia w opinii studentek / Anuszewska-Mastalerz K., Cieślik A., Gój K. [et al.]. Ann. UMCS 58. – 2003. – P. 9–14.
2. Baj-Korpak J. Aktywność fizyczna wybranych grup społeczno–zawodowych / J. Baj-Korpak, A. Soroka, F. Korpak // Człowiek i Zdrowie, t IV, 1. – 2010. – P. 152–161.
3. Bielski J. Metodyka wychowania fizycznego i zdrowotnego / J. Bielski // Impuls, Kraków, 2005.
4. Biernat, E. Międzynarodowy Kwestionariusz Aktywności Fizycznej (IPAQ) – wersja polska / E. Biernat, R. Stupnicki, A. K. Gajewski // Wychowanie Fizyczne i Sport, 2007. – 51. – P. 47–54.
5. Booth F. W. Waging war on physical inactivity: using modern molecular ammunition against an ancient enemy / F. W. Booth, M. V. Chakravarthy, S. E. Gordon, E. E. Spangenburg, 2002 // Appl Physiol, 2002 93 (1). – P. 3–30.
6. Booth, M. Assessment of physical activity: an international perspective / M. Booth // Research Quarterly for Exercise and Sport. –2001. – 71 (2 Suppl.): 114–120.
7. Bouchard C. Physical activity, fitness and health: the model and key concepts / C. Bouchard, R. J. Shephard // (In:) Physical activity, fitness and health. (Red.) C. Bouchard, R. J. Shephard, T. Stephens. Champaign, III, Human Kinetics Publishers. – 1994. – P. 77–88.
8. Caspersen C. J. Physical activity, exercise and physical fitness: definitions and distinctions for health–related research / C. J. Caspersen, K. E. Powell, G. M. Christensen // Public Health Reports. – 1985. – 100: 126–131.
9. Chakravarthy M.V. An obligation for primary care physicians to prescribe physical activity to sedentary patients to reduce the risk of chronic health conditions / M. V. Chakravarthy, M. J. Joyner, F. W. Booth // Mayo Clinic Proceedings, 2002. – 77 (2). – P. 165–173.
10. Drygas W. Aktywność fizyczna u osób zdrowych / W. Drygas // Forum Profilaktyki 3, 2008 (12). – S. 1
11. Harris, A. H. Physical activity, exercise coping, and depression in a 10–year cohort study of depressed patients / A. H. Harris, R. Cronkite, R. Moos // Journal of Affective Disorders, 2006. – 93 (1–3). – P. 79–85.
12. Kuński H. Trening zdrowotny osób dorosłych / H. Kuński // Wyd. Medsportpress, Warszawa, 2000
13. Narodowy Program Zdrowia (cz. II). – 1997. – Lider, 2. – P. 13–20.
14. Piątkowska M. Uczestnictwo Polaków w aktywności fizycznej w porównaniu do innych krajów Unii Europejskiej / M. Piątkowska; W: K. Buśko, J. Charzewska, K. Kaczanowski (red.) Współczesne metody badań aktywności, sprawności i wydolności fizycznej człowieka. AWF, Warszawa : 2010. – P. 38–57.
15. Raglin, J. S. Exercise and its effects on mental health / J. S. Raglin, G. S. Wilson, D. Galper // (In:) Physical Activity and Health. (Ed.) C. Bouchard, S.N. Blair & W.L. Haskell, Human Kinetics. –2007.
16. Stelmach M. Rola aktywności fizycznej w profilaktyce otyłości oraz innych przewlekłych chorób niezakaźnych : Człowiek i Zdrowie / M. Stelmach. – 2010. – T. IV, 1. – P. 50–58.
17. Szczeklik A. Choroby wewnętrzne. Przyczyny, rozpoznanie i leczenie / A. Szczeklik // Medycyna Praktyczna, Kraków, 2005.
18. Varo J. J. Distribution and determinants of sedentary lifestyles in the Europen Union / J. J. Varo, M. A. Martinez-Gonzalez, J. de Irela-Estevez // Int J Epidemiol 32..– 2003. – S. 138.
19. Welk G. J. A comparative evolution of the three accelerometry–based physical activity monitors / G. J. Welk, S. N. Blair, K. K. Wood, S. Jones, R. W. Thompson // Med Sci Sports Exerc 32. – 2000. – P. 489–497.
20. Woynarowska B. Edukacja Zdrowotna / B. Woynarowska // Wydawnictwo Naukowe PWN, Warszawa, 2008.

References

1. Anuszewska-Mastalerz , A., Cieślik, K., Gój, K., Jasnos, I., Włodarczyk, I., & Wanot, J. (2003). Aktywność fizyczna jako czynnik zdrowotnego stylu życia w opinii studentek.Ann. UMCS,58, 9-14.
2. Baj-Korpak, J., Soroka, A., Korpak, F. (2010) Aktywność fizyczna wybranych grup społeczno–zawodowych. Człowiek i Zdrowie, 1(4), 152–161.
3. Bielski, J. (2005). Metodyka wychowania fizycznego i zdrowotnego. Kraków: Impuls.
4. Biernat, E., Stupnicki, R., Gajewski, A.K. (2007) Międzynarodowy Kwestionariusz Aktywności Fizycznej (IPAQ) – wersja polska. Wychowanie Fizyczne i Sport, 51, 47–54.
5. Booth, F. W., Chakravarthy, M. V., Gordon, S. E., Spangenburg, E. E. (2002). Waging war on physical inactivity: using modern molecular ammunition against an ancient enemy. Appl Physiol, 93 (1), 3–30
6. Booth, M. (2000). Assessment of physical activity: an international perspective. Research Quarterly for Exercise and Sport, 71 (2 Suppl.), 114–120.

7. Bouchard, C., Shephard, R.J., Stephens T.(1994). Physical activity, fitness and health: the model and key concepts. (In:) Physical activity, fitness and health. (Red.) Champaign, Human Kinetics Publishers: 77–88.
8. Caspersen, C.J., Powell, K.E., Christensen, G.M. (1985). Physical activity, exercise and physical fitness: definitions and distinctions for health–related research. Public Health Reports, 100, 126–131.
9. Chakravarthy, M.V., Joyner, M.J. & Booth, F.W. (2002). An obligation for primary care physicians to prescribe physical activity to sedentary patients to reduce the risk of chronic health conditions. Mayo Clinic Proceedings, 77 (2), 165–173.
10. Drygas, W. (2008). Aktywność fizyczna u osób zdrowych. Forum Profilaktyki, 3 (12), s. 1
11. Harris, A.H., Cronkite, R. &Moos, R. (2006). Physical activity, exercise coping, and depression in a 10–year cohort study of depressed patients. Journal of Affective Disorders, 93 (1–3), 79–85.
12. Kuński, H. (2000). Trening zdrowotny osób dorosłych. Wyd. Medsportpress, Warszawa.
13. Narodowy Program Zdrowia (cz. II) (1997). Lider, 2, 13–20.
14. Piątkowska, M. (2010). Uczestnictwo Polaków w aktywności fizycznej w porównaniu do innych krajów Unii Europejskiej. Współczesne metody badań aktywności, sprawności i wydolności fizycznej człowieka, AWF, Warszawa, 38–57.
15. Raglin, J.S., Wilson, G.S. & Galper, D. (2007). Exercise and its effects on mental health. (In:) Physical Activity and Health. (Ed.) C. Bouchard, S.N. Blair & W.L. Haskell, Human Kinetics
16. Stelmach, M. (2010). Rola aktywności fizycznej w profilaktyce otyłości oraz innych przewlekłych chorób niezakaźnych. Człowiek i Zdrowie, 1(4), 50–58.
17. Szczeklik, A. (2005). Choroby wewnętrzne. Przyczyny, rozpoznanie i leczenie. Kraków: Medycyna Praktyczna.
18. Varo, J. J., Martinez-Gonzalez, M. A., de Irela-Estevez, J. (2003). Distribution and determinants of sedentary lifestyles in the Europen Union. Int J Epidemiol, 32,138.
19. Welk, G.J., Blair, S.N., Wood, KK., Jones, S., Thompson, R.W. (2000). A comparative evolution of the three accelerometry–based physical activity monitors. Med Sci Sports Exerc, 32, 489–497
20. Woynarowska, B. (2008). Edukacja Zdrowotna. Wydawnictwo Naukowe PWN, Warszawa.

Стаття надійшла до редакції 24.02.2017 р.