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Retrospective Analysis of Physical Recreation Intensity Accomplished in Primary and Secondary Prevention in Invasively-Treated Patients with Ischemic Heart Disease

Retrospektywna analiza natężenia rekreacji ruchowej realizowanej w ramach profilaktyki pierwotnej i wtórnej u leczonych inwazyjnie pacjentów z chorobą niedokrwienną serca

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Abstract

Background. Despite a large body of evidence proving the preventive character of physical recreation, there is still not much information on its intensity in patients with ischemic heart disease (IHD) and the influence of demographic factors on the intensity of this activity.

Objectives. The aim of the study is the retrospective analysis of physical recreation intensity accomplished in primary and secondary IHD prevention, along with the evaluation of the influence of chosen demographic factors (age, gender, education, place of residence) and previous medical consultations on its intensity, and the comparison between physical recreation intensity in analyzed groups and recommended minimal intensity of this activity amounting to 1000 Kcal/week.

Material and Methods. A population of 373 IHD patients (divided into two groups) was analyzed. Group I consisted of 244 patients who underwent invasive treatment due to acute coronary syndrome, which was the first clinical manifestation of IHD. In this group, 131 subjects were treated previously due to diseases which are IHD risk factors. Group II consisted of 129 patients with long-term IHD. All patients of both groups completed a physical activity sheet based on the Framingham questionnaire with an additional category evaluating the weekly intensity of physical recreation. The study was authenticated by completing a questionnaire after 3 months in order to check the respondents' honesty.

Results. The mean intensity of physical recreation accomplished in the scope of primary and secondary prevention was respectively 398.37 ± 169.77 Kcal/week and 404.72 ± 173.07 Kcal/week. This was not statistically significantly different and constituted only a small percentage of the recommended intensity of this activity. The analyzed demographic factors substantially determined physical recreation intensity but did not lead to the implementation of the recommendations concerning its preventive intensity. The patients treated due to diseases which are IHD risk factors presented a significantly lower intensity of physical recreation than patients who were not treated (372.66 ± 158.37 Kcal/week vs. 428.17 ± 178.18 Kcal/week).

Conclusions. The studies carried out showed an intensity of health-enhancing physical activity which was too low, not exceeding 50% of recommendations, accomplished in both primary and secondary IHD prevention, which was not significantly affected by the analyzed demographic factors. In view of the previously treated patients of group I, one of the main aims of the medical consultation, lifestyle modification, was not implemented. The recognition of IHD did not significantly determine the intensity of physical recreation (*Adv Clin Exp Med* 2011, 20, 3, 313–324).

Key words: leisure-time physical activity, ischemic heart disease, recommendations, demographic factors, prevention.

Streszczenie

Wprowadzenie. Mimo że istnieje wiele dowodów świadczących o zapobiegawczym znaczeniu rekreacji ruchowej, nadal niewiele wiadomo na temat jej natężenia w populacjach pacjentów z chorobą niedokrwienną serca (IHD) oraz wpływu czynników demograficznych na natężenie tej aktywności.

Cel pracy. Retrospektywna analiza natężenia rekreacji ruchowej realizowanej w ramach profilaktyki pierwotnej i wtórnej IHD, wraz z oceną wpływu na jej natężenie wybranych czynników demograficznych (wiek, płeć, wykształcenie, miejsce zamieszkania) i przebytych konsultacji lekarskich. Porównanie natężenia rekreacji ruchowej dla badanych grup z wynoszącym 1000 Kcal/tydzień zalecanym minimalnym natężeniem tej aktywności.

Materiał i metody. Analizie poddano 373 pacjentów z IHD wchodzących w skład dwóch grup. Grupa I – 244 pacjentów leczonych inwazyjnie z powodu ostrego zespołu wieńcowego, który był pierwszym objawem klinicznym IHD. Z tej grupy 131 osób było wcześniej leczonych z powodu chorób będących czynnikami ryzyka IHD. Grupa II – 129 pacjentów z wieloletnią IHD. Wszyscy pacjenci, wchodzący w skład obu grup wypełnili wzorowany na kwestionariuszu Framingham arkusz aktywności ruchowej wzbogacony o dodatkową kategorię oceniającą tygodniowe natężenie rekreacji ruchowej. Badanie uwiarygodniono, wykonując po 3 miesiącach kwestionariusz sprawdzający prawdziwość respondentów.

Wyniki. Średnie natężenie realizowanej w ramach prewencji pierwotnej i wtórnej rekreacji ruchowej wyniosło odpowiednio: $398,37 \pm 169,77$ Kcal/tydzień i $404,72 \pm 173,07$ Kcal/tydzień, nie było istotnie statystycznie różne i stanowiło jedynie niewielki odsetek zalecanego natężenia tej aktywności. Analizowane czynniki demograficzne istotnie determinowały natężenie rekreacji ruchowej, ale nie prowadziły do zrealizowania zaleceń odnośnie do jej prewencyjnego natężenia. Chorzy leczeni z powodu chorób będących czynnikami ryzyka IHD charakteryzowali się istotnie mniejszym natężeniem rekreacji ruchowej niż chorzy nieleczeni ($372,66 \pm 158,37$ Kcal/tydzień vs $428,17 \pm 178,18$ Kcal/tydzień).

Wnioski. Przeprowadzone badania wykazały zbyt niskie, nieprzekraczające 50% zaleceń, natężenie prozdrowotnej aktywności ruchowej, realizowanej zarówno w ramach prewencji pierwotnej, jak i wtórnej IHD, na które nie wpływały znacząco analizowane czynniki demograficzne. Wobec leczonych wcześniej chorych z grupy I nie zrealizowano jednego z głównych celów konsultacji lekarskiej – modyfikacji stylu życia. Rozpoznanie IHD nie determinowało istotnie natężenia rekreacji ruchowej (*Adv Clin Exp Med* 2011, 20, 3, 313–324).

Słowa kluczowe: rekreacja ruchowa, choroba niedokrwienna serca, zalecenia, czynniki demograficzne, prewencja.

Regular health-enhancing physical activity of moderate intensity plays an important role both in preventing ischemic heart disease (IHD) and in reducing the risk of death caused by it [1].

Apart from preventive actions categorized as “health promotion” directed to the entire society, and primary prevention addressed to individuals at risk of developing atherosclerosis, also toward the population in which its clinical symptoms have already been found, activities within the scope of secondary prevention should be taken. They are an integral part of IHD patient contemporary care and, apart from modern pharmacotherapy compatible with standards, should also include a number of lifestyle modifying actions [2].

An important role in the strategy of these activities is played by optimization of the intensity of health-enhancing physical activity, which apart from beneficial effects on exercise tolerance, reduces the intensity of modifiable IHD risk factors, resulting in a reduction in the incidence of cardiovascular events [3].

Taking into account the proven, beneficial effects of health-enhancing physical activity, the simplicity of actions that must be taken in order to increase its intensity and their relatively low cost, such kinds of modification should be of particular interest.

Despite a large body of evidence indicating the IHD preventive character of healthy physical activity and despite the coherency of recommendations con-

cerning its positive modification, the authors have difficulties in implementing them and applying formulated recommendations to a broad population. It results among others from difficulties in reliable estimation of this activity, arising from a lack of uniform, generally agreed and accepted methods of its evaluation. The fact that, in most cases, prospective studies of the intensity of health-enhancing physical activity are carried out on broad healthy populations, with no studies retrospectively evaluating populations of patients suffering from IHD, together with an evaluation of factors which could theoretically determine the intensity of this activity, seems also important.

The aims of the study were to:

- analyse the weekly physical recreation intensity accomplished in primary IHD prevention, along with an evaluation of the influence of chosen demographic factors on the value of this activity and a comparison between the obtained results and the recommended standard of minimal intensity of health-enhancing physical activity,
- evaluate the influence of medical consultations carried out in primary IHD prevention on physical recreation intensity,
- analyse the weekly physical recreation intensity accomplished in secondary IHD prevention,
- compare the physical recreation intensity accomplished in primary and secondary IHD prevention.

Material and Methods

A total of 373 patients with IHD were subjected to analysis in two groups. Group I was comprised of 244 patients (mean age 56.15 ± 6.67 years) subjected to primary coronary intervention (PCI) due to acute coronary syndrome (ACS). For all patients in this group, ACS was the first clinical manifestation of IHD. 131 subjects of this group (53.69%) had been previously treated in primary care and/or specialty clinics due to diseases which are CVD risk factors (hypertension, diabetes, lipid disorders).

Group II was comprised of 129 patients (mean age 70.26 ± 5.32 years) with long-term IHD (mean time from recognition 6.3 ± 1.7 years) who were

subjected to invasive treatment. The treatment was a planned phase of the therapy or was associated with the occurrence of ACS. The profile of IHD patients forming the analyzed groups is presented in Table 1.

With all patients with ischemic heart disease included in both analyzed groups, a survey containing questions concerning demographic data and the presence of IHD risk factors was carried out. Furthermore, an individual mean physical activity profile was evaluated using a physical activity sheet based on the Framingham questionnaire (Table 2). This was modified by adding an additional category called "physical recreation" evaluated per week. It contained planned, purposeful and regular forms of health-enhancing physical

Table 1. The profile of IHD¹ patients, forming the analyzed groups

Tabela 1. Charakterystyka pacjentów chorych na IHD¹ z analizowanych grup

	Group I (Grupa I)	Group II (Grupa II)
Number of subject (Liczba badanych)	244	129
Mean age – years (Średni wiek – lata)	56.15 ± 6.67	70.26 ± 5.32
Myocardial infarction presence (Wystąpienie zawału mięśnia sercowego)	211 (86.47%)	103 (79.84%)
BMI ² [kg/m ²]	27.84 ± 3.86	28.46 ± 4.12
Hemoglobin level [g%] (Stężenie hemoglobiny)	14.89 ± 1.24	13.96 ± 1.08
Echocardiographic parameters (Parametry echokardiograficzne)		
LVEDD ³ [mm]	54.16 ± 2.93	55.45 ± 3.14
EF ⁴ [%]	54.14 ± 4.06	53.18 ± 3.18
LA ⁵ [mm]	35.91 ± 3.47	37.88 ± 3.91
RVEDD ⁶ [mm]	21.56 ± 3.55	21.96 ± 3.98
LVIM ⁷ [g/m ²]	121.25 ± 19.32	125.21 ± 22.86
Contractility disorders (Zaburzenia kurczliwości)	215 (88.11%)	109 (84.49%)
Invasive treatment (Leczenie inwazyjne)		
PTCA ⁸	244	94
CABG ⁹		35
IHD ¹ risk factors (Czynniki ryzyka IHD)		
Hypertension (Nadciśnienie tętnicze)	137 (56.14%)	78 (60.46%)
Diabetes (Cukrzyca)	17 (6.96%)	15 (11.62%)
Cigarette smoking (Palenie papierosów)	116 (47.54%)	79 (61.24%)
Lipid disorders (Zaburzenia lipidowe)	147 (60.24%)	81 (70.97%)
Physical recreation < 1000 Kcal/week (Rekreacja ruchowa)	242 (99.18%)	129 (100%)
BMI ¹ > 25 kg/m ²	152 (62.29%)	91 (70.54%)

¹ Ischemic Heart Disease.

² Body Mass Index.

³ Left Ventricular End Diastolic Diameter.

⁴ Ejection Fraction.

⁵ Left Atrium.

⁶ Right Ventricular End Diastolic Diameter.

⁷ Left Ventricular Index Mass.

⁸ Percutaneous Transluminal Coronary Angioplasty.

⁹ Coronary Artery Bypass Graft.

¹ Choroba niedokrwienności serca.

² Indeks masy ciała.

³ Wymiar końcowo-rozkurczowy lewej komory.

⁴ Frakcja wyrzutowa.

⁵ Lewy przedsionek.

⁶ Wymiar końcowo-rozkurczowy prawej komory.

⁷ Wskaźnik masy lewej komory serca.

⁸ Przeszkorna śródniczyńska angioplastyka wieńcowa.

⁹ Pomosty aortalno-wieńcowe.

Table 2. Physical activity sheet based on the Framingham questionnaire**Tabela 2.** Arkusz aktywności ruchowej wzorowany na kwestionariuszu Framingham

Rest (Wypoczynek)	
Average hours of sleep (Średnia liczba godzin snu)	
Added rest (Dodatkowy wypoczynek)	
Job (Praca)	
What do you do? (Czym się zajmujesz?)	
Average hours per day (Średnia dzienna liczba godzin)	
Sedentary (Pozycja siedząca)	
Slight activity (Lekka aktywność ruchowa)	
Moderate activity (Średnia aktywność ruchowa)	
Heavy activity (Duża aktywność ruchowa)	
Extracurricular activities (Zajęcia fakultatywne)	
Average hours per day (Średnia dzienna liczba godzin)	
Sedentary (Pozycja siedząca)	
Slight activity (Lekka aktywność ruchowa)	
Moderate activity (Średnia aktywność ruchowa)	
Heavy activity (Duża aktywność ruchowa)	
Summary by Examiner (Podsumowanie)	
Average hours per day (Średnia dzienna liczba godzin)	
Sedentary (Pozycja siedząca)	
Slight activity (Lekka aktywność ruchowa)	
Moderate activity (Średnia aktywność ruchowa)	
Heavy activity (Duża aktywność ruchowa)	
Physical recreation (Rekreacja ruchowa)	
Average hours per week (Średnia tygodniowa liczba godzin)	
Sedentary (Pozycja siedząca)	
Slight activity (Lekka aktywność ruchowa)	
Moderate activity (Średnia aktywność ruchowa)	
Heavy activity (Duża aktywność ruchowa)	

activity. Additionally, the route taken on foot or by bicycle, provided that the activity lasted longer than 15 minutes each, was included in this category.

The intensity of physical activity was subjected to statistical analysis using the physical activity estimation method contained in the instructions to the source Framingham questionnaire. It con-

sisted of a precise specification of the type and duration of activities forming the category of physical recreation and multiplying the time (h) spent on individual activities with the “energy balance” (MET/h) normally given to these activities. Subsequent multiplying of the obtained product by the respondent’s body mass made it possible to obtain energy expenditure in kilocalories (Kcal) [4, 5].

The duration of individual components of the examined physical activity was evaluated to the nearest quarter-hour.

Only patients who reported no problems with estimating time spent on individual activities and who were not treated due to memory disorders were qualified to the examined groups.

The obtained data for patients in group I clearly indicated that the structured activity profile described the mean daily physical activity characteristic for a long-term asymptomatic period of feeling at full health, preceding ACS, in which the activity of the patients underwent only slight and short-term changes.

The activity profile in group II presented activity in the period directly preceding invasive treatment. This period lasted at least 1 year, during which patients with IHD were pharmacologically treated and demonstrated physical activity taking into account limited coronary efficiency.

As the standard of minimal physical recreation intensity accomplished in primary prevention of cardiovascular diseases adopted was 1000 Kcal/week [6].

The element that initiated the performance of essential statistical analysis was the evaluation of the reliability of data obtained from the physical activity sheet. It was carried out by completing, after 3 months, another physical activity sheet (similar to the original one) which was a "test of truthfulness" in 34 randomly selected patients (mean age 61.97 ± 8.96) included in group I and II.

A Student's t-test was used to test the significance of the difference of the two averages in subgroups for independent and dependent samples. A Levene test was used to test the hypothesis of group variance equality in the population.

An analysis of variance ANOVA followed by a Bonferroni test was used to test the significance of difference of more than two averages.

Results

All results were obtained in the scope of the project, evaluating the relationship between physical activity and physical performance in IHD patients, which gained the acceptance of the Bioethics Committee of the Military Institute of Medicine in Warsaw (Resolution No. 95/WIM/2005) [7].

The data reliability test carried out did not reveal any statistically significant differences between the intensity of physical recreation obtained in the compared physical activity sheets (376.43 ± 142.43 Kcal/week vs. 384.59 ± 1482.44 Kcal/week). An essential element of the evaluation was an analysis of the physical recreation intensity implemented

in group I in the scope of primary prevention. For patients of group I, the mean weekly intensity of physical recreation was 398.37 ± 169.77 Kcal/week and constituted 39.83% of the minimal intensity of health-enhancing physical activity.

Unitary analysis of the physical recreation intensity accomplished in the scope of primary prevention for patients of group I revealed that this activity was in the range of 92 to 1000 Kcal/week in 242 patients (99.18%) and exceeded 1000 Kcal/week in 2 patients (0.82% of the examined population).

The next phase was to analyze the influence of selected demographic factors on physical recreation intensity implemented in the scope of primary prevention in group I.

Group I consisted of 193 men and 51 women. The mean value of physical recreation intensity in the subgroup of men was 430.16 ± 166.25 Kcal/week and it was statistically significantly higher compared to the mean value of intensity of this activity in the subgroup of women, which was 278.07 ± 123.6 Kcal/week. Physical recreation in the case of the subgroup of men and women constituted respectively 43.01% and 27.80% of the standard of minimal intensity of physical activity.

Among group I respondents 35 were under 47 years of age and 35 were over 65 years of age. The arrangement of the respondents' ages into the cut-off point values mentioned above let authors obtain an adequately numerous, statistically credible subset of patients in extreme age.

The mean physical recreation intensity in patients included in the youngest subgroup was 448.07 ± 199.05 Kcal/week and it was statistically significantly higher compared to the mean value of physical recreation intensity in the oldest subgroup (337.88 ± 117.42 Kcal/week). In this case, weekly physical recreation intensity in the youngest and the oldest subgroups constituted respectively 44.80% and 33.78% of the standard of minimal intensity of physical activity.

In group I, the most frequently represented were individuals with secondary education (85 patients), followed by basic vocational education (68 patients), higher education (58 patients) and primary education (33 patients). For patients with primary education, the mean physical recreation intensity was 308.12 ± 129.07 Kcal/week. For individuals with basic vocational education, the value was 372.41 ± 160.59 Kcal/week, and for secondary education, it was 395.91 ± 170.25 Kcal/week. Group I patients with higher education were characterized by an average physical recreation of 478.29 ± 167.29 Kcal/week. Only physical recreation intensity in the subgroup with higher education was statistically significantly higher compared to the

intensity of this activity in all the other categories of education. No statistically significant differences between the physical recreation intensity in the other categories were found. The intensity of health-enhancing physical recreation in patients with primary, basic vocational, secondary and higher education was respectively 30.81%, 37.24%, 39.59% and 47.82% of the standard of minimal intensity of physical activity.

Among group I patients, 196 lived in the city and 48 in the countryside. The mean physical recreation intensity in the patients living in the city was 382.52 ± 2.3 Kcal/week and it was statistically significantly lower compared to the mean value of intensity of this activity in the subgroup of patients living in the countryside (463.1 ± 139.2 Kcal/week). Physical activity in the patients living in the city and in the countryside constituted respectively 38.25% and 46.31% of the standard of minimal intensity of physical activity.

The last phase of the analysis of group I activity was an evaluation of the influence of medical consultations (primary care/specialty clinics) completed before first IHD manifestation and

associated with the occurrence of diseases which are IHD risk factors (hypertension, diabetes, lipid disorders) on physical recreation intensity implemented in the scope of primary prevention.

The mean value of physical recreation intensity in the subgroup of patients who had medical consultations was 372.66 ± 158.37 Kcal/week and it was significantly statistically lower compared to the mean value of intensity of this activity in the subgroup of patients who did not have any medical consultations.

For group II patients, the mean weekly intensity of physical recreation was 404.72 ± 173.07 Kcal/week and it was 40.47% of the standard of minimal intensity of physical activity.

The values of physical recreation intensity for group I and II were not significantly statistically different from each other (398.37 ± 169.77 Kcal/week vs. 404.72 ± 173.07 Kcal/week).

The statement of the mean values of physical recreation intensity in group I and group II and in the subgroups separated from group I, together with the results of the average difference test, are presented in Figure 1.

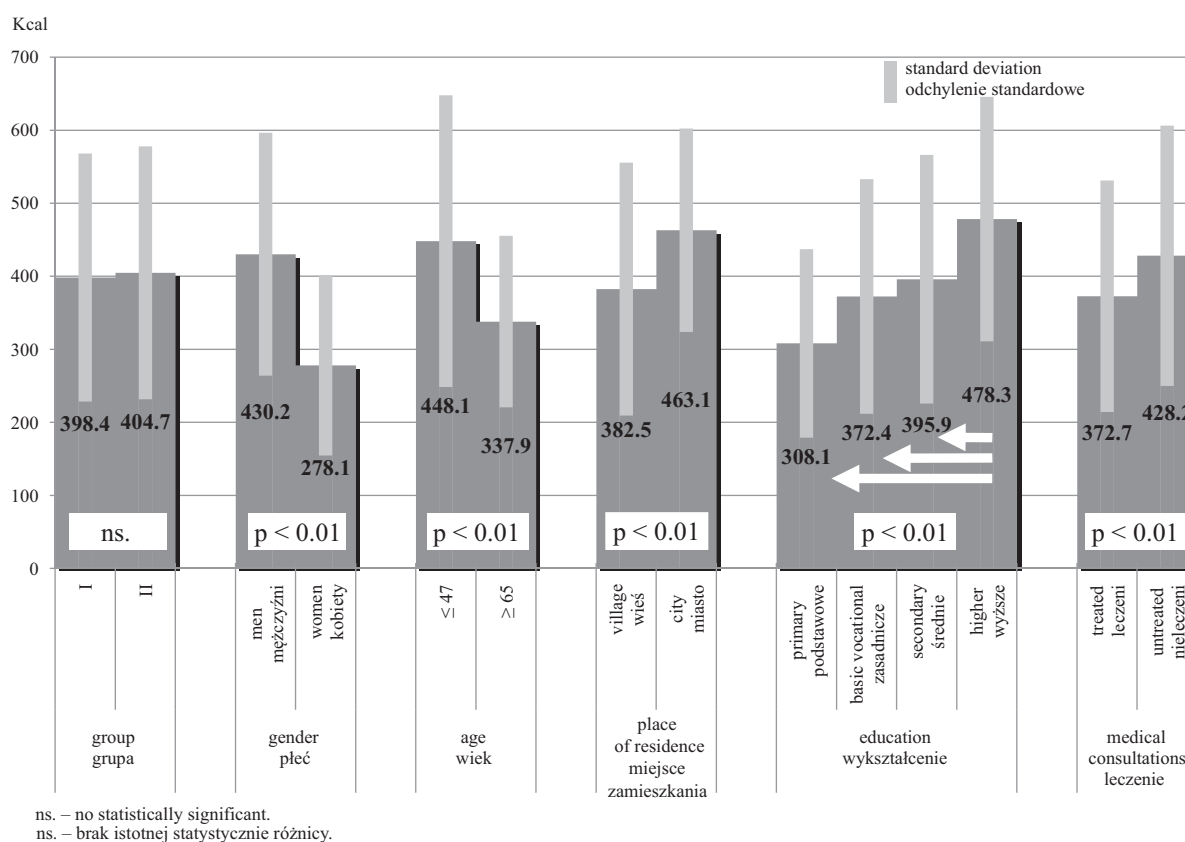


Fig. 1. Summary of mean values of physical activity intensity for group I and II and for subgroups separated from group I, together with results of the mean difference test

Ryc. 1. Zestawienie średnich wartości natężenia rekreacji ruchowej dla grup I i II oraz podgrup wydzielonych z grupy I wraz z wynikami testu różnicy średnich

Discussion

In view of alarming epidemiological prognoses, the fight against atherosclerotic cardiovascular disease has become one of the priorities and most serious challenges of contemporary medicine. We enjoy victories primarily related to the development of restorative medicine, but we are still bothered by the awareness that, despite the rapid development of modern treatment methods, long-term stability of clinical status is still relatively rarely achieved in populations that are at high risk [8].

On the basis of an analysis carried out in 52 countries, it was proven that six risk factors, i.e. hyperlipidemia, tobacco smoking, hypertension, diabetes, android obesity and psychosocial factors, combined with three cardioprotective factors, i.e. consumption of fruit and vegetables, small doses of alcohol and regular physical activity, determined as many as 90% of the cases of myocardial infarction in men and 94% in women [9].

This constitutes a basis to the claim that, at the present stage of scientific development, taking preventative intervention, which can limit the frequency of occurrence of cardiovascular disease and positively modify its possible course, is essential and deeply reasoned. Due to many advantages (such as simplicity of actions, wide availability, relatively low costs and effectiveness), modification of physical activity accomplished in both primary and secondary prevention seems particularly attractive.

In contrast to divergent opinions about the preventive character of physical activity associated with performing professional jobs, numerous, long-term population studies have unequivocally proven an incontrovertible relationship between leisure time physical activity and reducing the risk of falling ill or death due to cardiovascular disease. Therefore, they also constitute the basis for determining the effective intensity of regular health-enhancing physical activity in the context of cardiac prevention.

In all recommendations, the priority of cardioprotective physical activity is the regularity of its use, however it seems that the most important factor is the entire weekly amount of physical effort associated with specified total energy expenditure. It has been estimated at a minimal standard of 1000 Kcal (optimally 2000 Kcal) for the Polish population [6].

Implementation of the fundamental goal of the study made it possible primarily to assess the degree of implementation of recommendations concerning physical activity performed in the scope of primary prevention. The mean value of physical recreation intensity implemented in group I in the

scope of primary prevention was 398.37 ± 169.77 Kcal/week and in relation to the standard of minimal health-enhancing physical activity, constituted only a small percentage of its value.

This alarming result is reinforced by the unitary analysis of physical recreation intensity, which indicates that recommendations on intensity of this activity were implemented by only 2 patients out of a group of 244, that is by 0.82% of the analyzed group.

Studies of physical activity (accomplished in the scope of primary prevention) carried out on large populations in Poland and abroad have similar resonance.

It follows from the few studies carried out in Poland in the 1990's, by a team at the Medical University of Gdańsk among others, or from surveys of the Polish Central Statistical Office, that the level of physical activity of Polish society deviates significantly from international recommendations [10, 11].

In the context of these observations, it seemed important to carry out a study of the physical activity of the Polish population against a background of the population of other European countries. Such an analysis was performed for the residents of six countries (Finland, Spain, Germany, Poland, Russia and Hungary) in the project "Bridging the East-West Health Gap". The Polish study was performed on an urban population in Łódź. The surveys were sent to 1500 randomly selected patients. For the purposes of this analysis a sedentary lifestyle was defined as doing physical exercise lasting at least 30 minutes a day several times a year or less, and low physical activity of a communication nature as lasting less than 15 minutes. In this project clear differences were shown between the countries of Central and Eastern Europe, and Western European countries in terms of leisure time physical activity. It should be noted with regret that the Polish people have won first place in the infamous category of men and women in the incidence of sedentary lifestyle. Up to 70% of Poles do not perform any physical exercises and about 10% do it only occasionally (less than once a week). Lack of exercise cannot be compensated for by communication physical activity associated with travelling to and from work. Less than 10% of the Polish study participants walk or ride a bicycle to work. In addition, almost half of them deal with these activities less than 15 minutes a day [12].

Also, the results of the nationwide survey NATPOL Plus revealed that only about 41% of women and slightly more than 50% of men positively answered the question concerning performing any physical activity except for work. In these

studies, however, the frequency or duration of physical activity was not evaluated [13].

Observations indicating the prevalence of a passive lifestyle in our country were also confirmed by the study WOBASZ carried out on group of 13545 participants in the age range of 20–74 years. Over 50% of adults (over 55% of women and over 49% of men) are characterized by low leisure time physical activity (sedentary lifestyle). Lower Silesia, which the bulk of patients recruited to the presented study come from, is adversely presented in these statistics. 52% of men and 54% of women of this region prefer a sedentary life style [14].

A problem of similar magnitude is also found in the Baltic countries, where 60% of Lithuanians, 52% of Latvians and 43% of Estonians are characterized by a sedentary lifestyle in leisure time [15].

Americans also do not belong to the leaders in terms of regular physical activity. Recent studies show that only 15% of adult in the U.S. population have satisfactory physical activity (at least 3 times a week, at least 20 minutes of exercise per day). As much as 60% do not perform regular physical exercise in their leisure time, and approximately 25% do not perform any exercise at all [16].

In the search for factors determining the intensity of physical recreation accomplished in the scope of primary prevention, an analysis of the influence of selected demographic factors on this activity was carried out in group I.

The analysis of physical recreation intensity depending on the gender of the respondents indicates a statistically significantly higher intensity of this activity in men (430.16 ± 166.25 Kcal/week) compared to recreational activity in women (278.07 ± 123.6 Kcal/week). The lower physical activity of women can result from the biological tasks assigned to them and stereotypes of motor behavior shaped from the early years of life. It is influenced by the character of play in childhood, with lower physical activity than in boys, and determines limiting activity to the tasks associated with the fundamental duties of taking care of the family in adult life. While the higher physical activity in men can be assigned to a greater need for physical activity, inherently associated with male features, already reinforced in childhood by those who raise them, especially male caregivers, and a stronger motivation to take up competition in the amateur sports field. Identical observations about physical activity on the population of Framingham carried out by Kannel and colleagues, emphasized the fact that women are generally less physically active than men [17].

The next stage of the study was to evaluate the relationship between the age of the patients included in group I, and the physical recreation

intensity presented by the patients. The focus was directed on two subgroups in the “extreme” age for the examined population, i.e. < 47 years of age (youngest subgroup), and > 65 years of age (oldest subgroup).

The analysis of physical recreation intensity of the youngest and oldest subgroups indicates a statistically significantly higher intensity of this activity in the youngest subgroup compared to the activity presented in the oldest subgroup (448.07 ± 199.75 vs. 337.88 ± 117.42 Kcal/week).

The result obtained confirms the observations provided by daily clinical practice. Low physical recreation intensity in the oldest subgroup results from a number of conditions related primarily to the physiological process of aging.

The involutinal changes occurring with age, that are evoked by a muscle atrophy, lead to a significant loss of capacity for short-term efforts with maximum intensity. This, in turn, induces the reluctance to perform physical exercise, which is “every day” more and more difficult. A passive lifestyle causes a decrease in exercise tolerance, which is the main reason for motor activity failure [18].

An important role in the senior population is also played by “disorders of the wearing out”, dominated by the degenerative diseases of the musculoskeletal system with chronic pain syndromes, substantially limiting physical activity, and chronic respiratory system diseases, dominated by ventilation disorders associated with long-term cigarette smoking.

Another important element adversely affecting the intensity of physical recreation in the oldest subgroup is cultural factors which, by associating the hoary age with immobility, also affects the reduction of physical activity in older people.

Therefore the fact of a significantly greater intensity of physical recreation in the youngest subgroup compared to the oldest is not surprising. However it might be expected that the lack of restrictions specific to the oldest subgroup will allow the youngest subgroup to easily achieve a high intensity of recreation.

Therefore it might be tempting to conclude that the changes associated with the body aging would only worsen inadequate the intensity of physical recreation in the context of preventive action.

A subsequent factor examined was associated with the education of the respondents. Four categories of education were distinguished, which beyond the scope of acquired knowledge also differed in the number of years of schooling. It can be assumed that the necessity of longer education affects the development of self-awareness, in which knowledge about health should occupy an important place.

The analysis of the mean values of physical recreation intensity of subsequent categories of education starting from primary (308.12 ± 129.07 Kcal/week), through basic vocational (372.41 ± 160.59 Kcal/week) and secondary (395.91 ± 170.25 Kcal/week) to higher education (478.29 ± 167.29 Kcal/week) indicates a trend of mean values of activity increasing along with education. However, only the subgroup characterized by a higher education presented a statistically significantly higher intensity of this activity compared to the activity of respondents in all other categories of education. The differences of physical recreation intensity between all other categories of education have not been found.

In survey research performed on 114 patients (aged 65 ± 13 years old) with a diagnosed coronary disease treated in cardiac units, it was proven that physical exercise was regularly performed by 16% of patients with primary or basic vocational education, 34% of patients with secondary education and 38% of patients with higher education [19]. For all of them, the achieved values were considered too small. Also, several studies conducted *inter alia* in the USA, Australia and various European countries show that the lowest level of physical activity is characterized by individuals with the lowest income and education, as well as individuals belonging to the lower classes of society [20, 21]. The respondents' education is also related significantly to the intensity of other IHD risk factors [22].

This data is in convergence with the trends observed in our study, which suggests that there are differences in health habits of the Polish society that probably result from a different perception of their importance. This trend probably reflects the more developed awareness of appropriate behavior patterns in more highly educated people.

The demographic factor whose association with physical activity has been emphasized in many studies is the place of residence of the respondents. The classical division, in this case, divided patients into populations living in the city and in the village. The analysis of weekly physical recreation intensity of patients living in the village (463.1 ± 139.2 Kcal/week) indicates, that it is statistically significantly higher compared to physical recreation intensity seen in inhabitants of urban areas (382.52 ± 2.3 Kcal/week). This is in line with the observations of other authors, who have noted a higher dose of physical activity in people living in the village compared to a metropolitan population [23, 24]. A part of this activity is associated with the necessity of traveling. Worse infrastructure and limited availability of means of public transport promote moving on foot or by bicycle. The importance of regular physical activity, forced

by the necessity of reaching the workplace, often located far from the place of residence, has already been emphasized by other researchers [23, 25].

In summary, it can be concluded, that the mean intensity of physical recreation accomplished in the scope of primary prevention, which did not even reach 50% of the minimal recreation intensity standard, should raise an understandable concern. All the more, that the analysis of intensity of IHD risk factors occurring in group I (Table 1) indicates the fact that insufficiently forced physical activity was the most common risk factor for IHD. Also, the demographic factors analyzed only slightly and insufficiently affected recreation activity intensity, which also did not reach 50% of the minimal recreation intensity standard in subsequently analyzed subgroups.

131 patients out of group I (53.69%) completed medical consultations in primary care and specialty clinics due to diseases that are IHD risk factors (arterial hypertension, diabetes, lipid disorders) in the period preceding the first IHD manifestation. Unfortunately, it did not positively and significantly affect physical recreation intensity, which was 373.66 ± 158.37 Kcal/week in the treated subgroup and was statistically significantly lower compared to the physical recreation intensity of 428.17 ± 178.18 Kcal/week in the subgroup of patients who had not been taking advantage of medical consultations, associated with the occurrence of these disorders before the beginning of ACS.

According to a WHO report from 1993, the task of increasing physical activity should be treated as seriously as the treatment of arterial hypertension and lipid disorders and fighting against the tobacco-smoking habit. Significantly lower intensity of recreational activity in a treated subgroup was probably related to the lack of awareness about the beneficial effects of physical activity on the disorder diagnosed in them and with a sense of threat from the possibility of overloading the circulatory system by the physical activity. On the one hand, it is probably the result of too little enthusiasm and carefulness of the medical milieu in recommending physical exercise as an important element of preventive health care [26]. On the other hand, it may be associated with a considerable resistance in the assimilation of knowledge regarding the need for a healthy lifestyle by patients themselves. This is confirmed by the study carried out on a group of healthy 50-years-old individuals, which revealed that, after scarcely 2 years of regular GP visits, phone calls and leaflet campaigns, the percentage of people exhibiting satisfactory physical activity, that is 30 minutes of moderate physical exercise 5 times a week, has increased dramatically – from 2% to almost 30% [27].

Omission of the correct initiation of preventive action by the medical community, unfortunately, still results in one more negative and potentially dangerous aspect. Some patients who will, however, take the trouble of physical activity intensification, left without medical supervision, will visit places offering so-called “cardio workout”. A workout carried out without pre-qualification and specialist supervision, no doubt perfect for individuals enjoying full health, in the case of patients at risk of IHD or those in the pre-clinical stage of the disease not only fails to achieve the desired effects, but also increases the risk of occurrence of adverse events in such patients [28].

Therefore, it should be emphasized, that the subject of a positive modification in physical activity discussed during a medical appointment should comprise precise information about the way to carry out that recommendation. Official European Society of Cardiology Guidelines from 2007 have recommended about thirty minutes of moderate intensity aerobic exercises together with 5–10 minutes of warm-up and 5–10 minutes of final cool-down exercises at least five times per week. The exercise intensity should be established at the level of 60 to 75 percent of maximal heart rate obtained at the moment of peak exertion. As an alternative, mild exercise according to the Borg scale may be used. It evaluates a subjective feeling of fatigue on a 15-grade scale [6 to 20 points]: < 12 – light effort (40–60% HR_{max}), 12–13 – mild effort (60–75% HR_{max}) and 14–16 – hard effort (75–90% HR_{max}). What is most important when taking up safe, health-oriented physical activity is that current ESC guidelines emphasize that there is no evidence suggesting that increasing physical activity over the recommended standards makes it possible to achieve any additional benefits with respect to CVD prevention [28]. One of the most important elements of the medical appointment, which should be antecedent to physical activity intensification, is risk stratification of cardiovascular complications as a result of implementation of this modification.

The actions mentioned above should concentrate on the assessment of the general medical condition (including physical activity contraindications) and global cardiovascular risk, as well as on cardiac examinations with a fitness estimation of the examined person. In the medical history, the physician has to blow the whistle on any anginal pain, exercise-related loss of consciousness, or other symptoms of bad tolerance of physical exercise and any aggravating family history. These activities have a special significance in men over 40 years old and women over 50 years old who, apart from initial qualifications during any inten-

sification of physical activity, should be regularly monitored [28, 29].

The emphasis placed on the fight against modifiable risk factors for IHD such as smoking, arterial hypertension, hyperlipidemia and diabetes, monitored by subsequent studies by EUROASPIRE, are beginning to bear fruit, as evidenced in inter alia observations performed in five hospitals in Cracow implementing these studies. The implementation of recommendations concerning secondary prevention was significantly improved, as was the attitude of people working in the centers participating in the study toward secondary prevention of ischemic heart disease. Especially this latter fact may be crucial for the effectiveness of preventive measures already undertaken in the groups affected by ischemic heart disease. One can only hope that with time, the positive modifying health-enhancing physical activity that is constituent in both primary and secondary prevention will face understanding and find a place in daily clinical practice [30].

The second aim of the study was to evaluate the intensity of health-enhancing physical activity accomplished in the scope of secondary prevention in a population of patients with long-term ischemic heart disease. To assess the physical activity intensity accomplished in the scope of secondary prevention, a standard determined for primary prevention was used, assuming that health-enhancing physical activity already implemented in the population suffering from IHD should not be lower than in the population at risk of atherosclerotic IHD.

Despite evidence confirming a beneficial effect of regular physical exercise on reducing the probability of the occurrence of subsequent cardiovascular events, epidemiological analysis indicates a tendency, presented in individuals suffering from IHD, to limit their daily life and physical activity [31].

The mean physical recreation intensity for patients included in group II was 404.72 ± 173.07 Kcal/week and constituted a small percentage of the minimal health-enhancing physical activity standard.

Such a poor result is probably associated with the fear expressed by authors of other observations of worsening health status and anxiety of anginal pain occurrence, and often with the overprotection of the family. However, it demonstrates primarily a lack of implementation of one of the key objectives set by the standards of secondary prevention of IHD [27].

The comparison of physical recreation intensity implemented in the scope of primary prevention in group I with recreation intensity imple-

mented in the scope of secondary prevention in group II, shows a lack of statistically significant differences between these values. Therefore, it is difficult to resist the conclusion that IHD recognition does not significantly influence physical recreation intensity implemented in the scope of secondary prevention.

Unfortunately, despite numerous and reliable scientific evidence, the level of awareness and physical activity scale in both healthy modern human populations and suffering those from IHD are still very low.

As can be seen from the analysis presented, despite the undeniable evidence and developing standards based on them, the implementation of those recommendations into practice poses one of the greatest difficulties. All this shows that we are a society that does not sufficiently benefit from simple tools for health improvement such as a healthy lifestyle and one of its most essential elements – physical activity.

In the world of modernity, comfort and advanced technology, behind which implementation is a powerful industrial lobby, simple actions that do not require the use of advanced technology and the mobilization of substantial financial resources for this purpose, are practically unused. Maybe the key to changing the status quo is fighting the stereotype of physical activity identified only with fatigue and pouring sweat, consisting of a compre-

hensive promotion of physical activity and knowledge of its beneficial effect in the entire population, starting from the schools, the workplace and free time, and ending with the elderly.

Unfortunately, in consideration of the health-oriented physical activity of the examined groups, which are only a small segment of the population of our country, it is hard to resist thought of the versatility of the words of poet Jan Kochanowski, who, a few centuries ago, modified our national proverb in the song V, reaching even sadder reflections, “The Pole once bitten, twice bitten...”

The authors concluded that the studies carried out have revealed an intensity of health-enhancing physical activity which is too low, not exceeding 50% of recommendations, implemented in the scope of both primary and secondary IHD prevention. Age, gender, place of residence and education have significantly determined the intensity of health-enhancing physical activity, but they did not influence the implementation of recommendations on its intensity in primary IHD prevention. The medical actions taken in the subgroup treated due to disorders that are factors of IHD have not led to the implementation of one of the basic aims of primary prevention. The recognition of IHD in the examined group of patients did not significantly influence physical recreation intensity.

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