

PART II. PHYSICAL ACTIVITY OF SOCIAL AND PROFESSIONAL GROUPS
DZIAŁ II. AKTYWNOŚĆ FIZYCZNA GRUP SPOŁECZNYCH I ZAWODOWYCH

ECONOMIC CORRELATES OF PHYSICAL ACTIVITY IN ADULTS

EKONOMICZNE KORELATY AKTYWNOŚCI FIZYCZNEJ OSÓB DOROSŁYCH

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- A. Study design/planning
zaplanowanie badań
- B. Data collection/entry
zebranie danych
- C. Data analysis/statistics
dane – analiza i statystyki
- D. Data interpretation
interpretacja danych
- E. Preparation of manuscript
przygotowanie artykułu
- F. Literature analysis/search
wyszukiwanie i analiza literatury
- G. Funds collection
zebranie funduszy

Summary

Background. Physical activity plays an immensely significant role in the prevention and treatment of diseases that often lead to premature death. The aim of this study was to examine the relationships between physical activity of adults and determinants of their financial situation such as steady income, per capita income, savings, and indebtedness.

Material and methods. The study was carried out between 2014 and 2015 in Wrocław, Poland on a group of 4332 residents aged 18 to 64 years. The respondents' habitual physical activity levels and income status were assessed with the International Physical Activity Questionnaire Short Form (IPAQ-SF) and the author's own Socio-Economic Status of Working Age People Questionnaire (S-ESQ), respectively.

Results. There are positive correlations between physical activity level and socio-economic status. Steady income and per capita income are two determinants of differences in physical activity in individuals over 44 years of age. The highest level of physical activity was noted in adults with a steady income of more than USD 542 per month. Respondents with savings were also more physically active than their counterparts without savings. Finally, Wrocław residents who were without debts and who were aged 18-44 years were more physically active than were financially indebted residents.

Conclusions. Actions should be undertaken to enhance physical activity of those adults remaining in a poor socio-economic situation.

Keywords: adults, physical activity, income status

Streszczenie

Wprowadzenie. Aktywność fizyczna odgrywa istotną rolę w profilaktyce i terapii chorób, które są często przyczyną przedwczesnych zgonów. Celem pracy jest identyfikacja związków zachodzących między poziomem aktywności fizycznej a takimi aspektami sytuacji materialnej, jak: występowanie stałego źródła dochodów, wysokość dochodów na osobę oraz posiadanie oszczędności i zadłużenia u osób dorosłych.

Materiał i metody. Badania przeprowadzono w 2014 i 2015 roku we Wrocławiu (Polska). Materiał badań liczył 4332 osoby w wieku od 18 do 64 lat. Poziom nawykowej aktywności fizycznej i sytuację materialną badanych oceniono za pomocą Międzynarodowego Kwestionariusza Aktywności Fizycznej w wersji krótkiej oraz Kwestionariusza Statusu Społeczno-Ekonomicznego Osób Dorosłych.

Wyniki. Występują dodatnie korelacje między poziomem aktywności fizycznej a statusem społeczno-ekonomicznym. Stały dochód oraz jego wysokość na osobę to czynniki różnicujące aktywność fizyczną badanych w wieku powyżej 44 lat. Najwyższym poziomem aktywności fizycznej cechowały się osoby o stałych dochodach w wysokości powyżej 542 dolarów miesięcznie. Badani posiadający oszczędności cechowali się wyższym poziomem aktywności fizycznej od osób ich nieposiadających. Niezadłużeni wrocławianie w wieku od 18 do 44 lat byli bardziej aktywni fizycznie od osób posiadających długi.

Wnioski. Należy podjąć działania zmierzające do zwiększenia aktywności fizycznej osób znajdujących się w niekorzystnej sytuacji materialnej.

Słowa kluczowe: osoby dorosłe, aktywność fizyczna, czynniki ekonomiczne

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Introduction

Several studies have confirmed the significant role of physical activity in the prevention and treatment of diseases that often lead to premature death [1, 2, 3]. Positive correlations between physical activity and physical performance and fitness have also been proven [4]. Undertaking physical activity of the proper frequency, volume, and intensity has beneficial effects on both the mental health [5] and overall quality of life of adults [6, 7, 8].

According to Sallis et al. [9], physical activity can be determined by a number of factors, including one's socio-economic status. Chung et al. [10], Kim and So [11], and Biernat [12] have noted that people with higher incomes are more physically active than those with lower incomes. Research carried out on groups of manual workers in Brazil [13] and China [14] revealed the highest physical activity levels among people with the highest and the lowest incomes. On the other hand, Van Stralen [15] found that economic status was not significantly correlated with the amount of physical activity undertaken.

Earlier studies have in fact reached divergent conclusions. Moreover, the socio-economic status of study participants has been investigated only in relation to income per capita, without considering other significant determinants of income status such as steady income, money savings, or indebtedness. The aim of the present study was to examine relationships between physical activity levels and such determinants of financial situation as steady income, per capita income, savings, and indebtedness in adult residents of the city of Wrocław, Poland.

Material and methods

This study took place between 2014 and 2015 in Wrocław, Poland. The research project was approved by the Commission of Bioethics of the University of Physical Education in Wrocław. The research sample consisted of 4332 people aged 18-64 years. The sample selection was random, using a three-level stratification. The division of respondents into age groups was based on the classification of the Polish Central Statistical Office of working age into the so-called mobile age (18-44 years) and immobile age (45-65 years). The respondents' income category was defined in consideration of the social minimum level and average gross income per capita in a one-person household. Almost 81% of the studied residents had a steady income. For 45%, the average monthly income per capita was from USD 271 to 542; for 28% - below USD 271; and for 27% - above USD 542. About 46% of respondents had money savings, and 49% were in debt. Statistically significant differences in income status variables were found between subjects aged over and under 44 years (Table 1).

Table 1. The number and percentage of participants in groups according to their age and selected variables of income status

Variable	Category	total n = 4332		under 44 years n = 2593		over 44 years n = 1739		χ^2	p
		n	%	n	%	n	%		
Steady income	Yes	3494	80.7	2017	77.8	1477	84.9	34.08	< 0.001
	No	838	19.3	576	22.2	262	15.1		
Per capita income	below USD 271	1214	28.0	746	28.8	468	26.9	2.12	≥ 0.05
	USD 271-542	1957	45.2	1167	45.0	790	45.4		
	above USD 542	1161	26.8	680	26.2	481	27.7		
Savings	Yes	2009	46.4	1210	46.7	799	45.9	0.22	≥ 0.05
	No	2323	53.6	1383	53.3	940	54.1		
Indebtedness	Yes	2107	48.6	1127	43.5	980	56.4	69.24	< 0.001
	No	2225	51.4	1466	56.5	759	43.6		

Notes: χ^2 – chi-squared independence test, p – chi-squared independence test probability value

The study used an auditorium survey. Respondents' habitual physical activity and income status were assessed with the use of the International Physical Activity Questionnaire Short Form (IPAQ-SF) [16] and the author's own Socio-Economic Status of Working Age People Questionnaire (S-ESQ).

The data from IPAQ-SF were used to determine respondents' energy expenditure on physical activity (EEPA) expressed in MET-min/week, calculated following the Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire as a total of physical activities at three intensity levels performed by respondents on a weekly basis [16].

The S-ESQ was used to determine four income status variables: steady income (YES, NO), per capita income in a household (< USD 271, USD 271-542, > USD 543), having savings (YES, NO), and indebtedness (YES, NO).

For each independent variable, the size (n) and ratios (%) for the age groups and the whole study group were estimated. Differences in the financial status of Wrocław residents in regard to their age were verified with Pearson’s chi-squared test of independence (χ^2). As for the EEPA (dependent variable), arithmetic means were calculated for the total group, age groups, and groups according to particular variables of income status. Relationships between residents’ physical activity levels and income status were verified with the one-factor ANOVA test (F), and multiple regression analysis, separately for residents over and under 44 years. The levels of statistical significance were set at $\alpha < 0.05$ and $\alpha < 0.001$. All statistical calculations were made with the use of Statistica 13.1 (Dell Inc.).

Results

The analysis of mean values of the EEPA index in groups according to the variable of having a steady income revealed significant differences between individuals with and without a steady income in the group above 44 years of age ($F = 36.1, p < 0.001$). The mean EEPA in individuals with a steady income amounted to 2841 MET-min/week, and in individuals without a steady income – to 1768 MET-min/week. Among the Wrocław residents aged above 44 years, the mean EEPA values differed significantly between groups according to income per capita ($F = 10.4, p < 0.001$). The highest level of physical activity (3197 MET-min/week) was found among residents with income over USD 542 per month, and the lowest (2267 MET-min/week) among residents with income below USD 271. Also the highest EEPA was found in residents under 44 years of age (3074 MET-min/week) and over 44 years of age (2972 MET-min/week) who had money savings. The levels of physical activity among these residents were significantly higher ($p < 0.001$ – residents under 44 years of age; $p < 0.05$ – residents over 44 years of age) than levels in residents without money savings (2485 MET-min/week in residents under 44 years of age; 2431 MET-min/week in residents over 44 years of age). The F-distribution value ($F = 41.8$) and $p < 0.001$ showed that physical activity levels were also significantly different among indebted respondents under 44 years. The mean EEPA (3011 MET-min/week) of residents with no debt was higher than for residents with debt (2433 MET-min/week) (Figure 1).

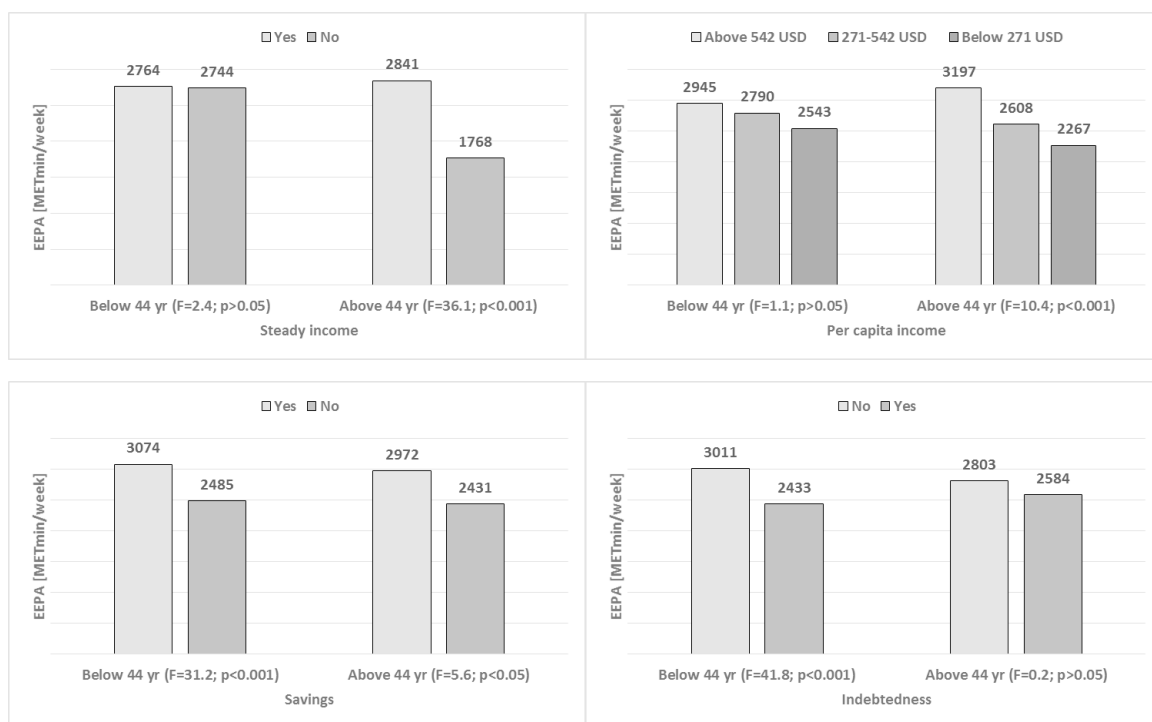


Figure 1. Differences in physical activity levels in groups of respondents according to age and income status variables

Table 2 shows multiple regression models illustrating relationships between EEPA (dependent variable) and the income status of adult Wrocław residents (independent variables). Significant correlations were found between physical activity levels, money savings, and indebtedness ($p < 0.001$) among residents under 44 years of age. The level of total physical activity was the highest in individuals with money savings and without indebtedness (Table 2).

Table 2. Respondents' physical activity levels and income status variables

Variable	Category	under 44 years				over 44 years			
		β	SE	t	p	β	SE	t	p
	Intercept	2786.4	44.9	62.05	< 0.001	2425.1	67.7	35.82	< 0.001
Steady income ^a	Yes	-69.8	44.6	-1.56	≥ 0.05	409.3	68.1	6.01	< 0.001
Per capita income ^b	below USD 271-542	-9.8	48.1	-0.20	≥ 0.05	-116.3	61.7	-1.89	≥ 0.05
	above USD 542	86.4	59.1	1.46	≥ 0.05	337.6	74.0	4.56	< 0.001
Savings ^c	Yes	229.1	41.0	5.59	< 0.001	120.0	50.5	2.38	< 0.05
Indebtedness ^d	No	239.2	37.0	6.47	< 0.001	23.0	47.5	0.48	≥ 0.05

Notes: ^aThe reference category for having a steady income is NO, ^bThe reference category for per capita income is below 271 USD, ^cThe reference category for having savings is NO, ^dThe reference category for indebtedness is YES

Abbreviations: β – assessment value of model parameters, SE – standard error β , t – parameter significance, p – probability value

In the group of residents over 44 years of age, statistically significant correlations were found between physical activity and having a steady income ($p < 0.001$), having a monthly income per capita of above USD 542 ($p < 0.001$), and having savings ($p < 0.05$). Respondents with a steady income were more physically active than those without one, and respondents with the highest per capita income were more physically active than respondents with medium and low per capita income. Among the Wrocław residents above 44 years of age, having savings was correlated with a higher level of physical activity (Table 2).

Discussion

This study reveals positive correlations between physical activity levels and income status of adult residents of Wrocław. Steady income and per capita income are significant differentiating factors of physical activity of respondents aged over 44 years. The highest physical activity levels were found in individuals with a steady income above USD 542 per month. Wrocław residents with money savings, regardless of their age, were more physically active than their counterparts without savings. In the group of Wrocław residents under 44 years of age, respondents with debts reported a lower level of physical activity than did their debt-free counterparts.

Having a steady income has not been previously studied as a determinant of physical activity level. In the present study, such correlations were only found in Wrocław residents over 44 years. Residents with a steady income usually work full time in their profession. Previous researchers have proven a significant contribution of physical activity related to the performance of professional chores and to commuting to total physical activity [17]. Higher physical activity levels have also been found in working individuals than in the unemployed [18].

The level of physical activity of Wrocław residents aged over 44 years in this study also differed significantly in terms of per capita income, especially among individuals with the highest income. Higher physical activity levels along increasing income per capita were also found by Choi et al. [19], Kim and So [11], and Kari et al. [20]; and among a Polish population by Biernat [12], Biernat and Piątkowska [21], Pocztarska and Bergier [22], and Puciato [23]. Correlations between physical activity and the highest income status were investigated by Chung et al. [10]. High incomes allow for purchasing various goods and services directly (e.g. gym subscriptions) or indirectly (e.g. transportation to and from gym facilities). Also, individuals of high-income status have been shown to use their leisure time rationally, i.e. mostly actively, due to it being a limited resource [24].

Interestingly, this study did not reveal significant correlations between steady income and income per capita and physical activity levels in respondents aged 18-44 years. The dynamic socio-cultural transformations that younger generations of Poles especially are so much subjected to have not made steady employment as valuable as it has been for the older generations. People below the age of 44 very often work part-time or occasional jobs, both of which make their activities more flexible. Income level usually increases with age. Additionally, for young people satisfaction from work can also come from pursuing their own interests, self-fulfillment opportunities, and leisure resources [25].

Regardless of Wrocław residents' age, their physical activity level was significantly affected by the fact of having savings. Money savings are complement to one's income and an important co-determinant of household status. The relationships of adults' physical activity with savings is analogous to those with income per capita. Moreover, according to the National Bank of Poland [26], the saving rate at the end of 2015, calculated as gross saving divided by gross disposable income, was only 1.6%. In terms of savings, Poland ranked 39th in the world, and having greater savings was characteristic of not only citizens of the wealthiest countries, but also of countries with a similar level of socio-economic development to Poland, i.e. Portugal, Greece, Hungary, Czech

Republic, or Bulgaria. It can be thus concluded that in the Polish economic reality having savings remains the preserve of a rather narrow group of wealthy individuals whose levels of physical activity are the highest.

The last variable contributing to the economic situation of Wrocław residents in this study was indebtedness, which significantly affected physical activity differences in respondents under 44 years. At the end of 2015, the financial liabilities of Polish households amounted to USD 170.2 billion (USD 4428.7 per capita) [26], which meant that about 31.5% of Poles had debts. For about 33% of indebted Poles, their debts exceeded their annual household income. Debt payments always erode current income and can contribute to the deterioration of a household's social functioning [27]. They are often associated with the necessity of taking extra jobs, which further constrain leisure time. The most common forms of debt are real estate mortgages, home renovation loans, or consumer durables loans. It must be stressed that in Poland these liabilities are usually incurred by young people at the start of their professional career or family life. This explains why indebtedness was an income status index significantly affecting the level of physical activity in the younger age group under study.

Since the physical activity of adults is highly significant for their proper social and individual functioning [28-31], it is necessary to undertake effective actions regarding individuals prone to hypokinesia, i.e. people without a steady income, low income, no money savings, and debt. Programs aimed at improving physical activity levels should be initiated by these individuals as well as companies, local authorities, or government institutions.

Conclusions

Positive correlations are found between physical activity and the socio-economic status of a working-age population from Wrocław, Poland. The study of physical activity has a number of significant and broad practical implications for public health. It is necessary to seek new and effective remedial programs regarding hypokinesia. The results show that individuals prone to hypokinesia are people with low income, with no money savings, and with debts. More physical activity, and thus, better health status and quality of life, can greatly contribute to higher work efficacy of working-age people and significantly improve the output of business companies and national economies.

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