Annals of Agricultural and Environmental Medicine 2015, Vol 22, No 1, 118–123
www.aaem.pl

ORIGINAL ARTICLE

Association of socio-economic and demographic factors with physical activity of males and females aged 20–69 years

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Biernat E, Tomaszewski P. Association of socio-economic and demographic factors with physical activity of males and females aged 20–69 years. Ann Agric Environ Med. 2015; 22(1): 118–123. doi: 10.5604/12321966.1141380

Abstract

Objective. To assess the physical activity of working residents of Warsaw aged 20–69 years, as well as to identify the socio-demographic factors associated with their levels of physical activity.

Materials and method. The study involved 2,544 working residents of Warsaw aged 20–69 years. The short version of the IPAQ was applied and four physical activity levels (insufficient, sufficient, augmented, high) were distinguished. The relationships between physical activity and gender, age, BMI, education, economic and martial status as well as participation in recreation were determined.

Results. High levels of physical activity were reached by 8% of respondents, 22% achieved augmented level, 32% were sufficiently and 32% insufficiently active. Out of 2544 studied subjects, 6% declared complete sedentariness. Females were, as compared to males, more frequently ($p<0.05$) insufficiently active (35.9 vs. 31.9%). In obese and overweight subjects insufficient physical activity predominated (42.9 and 36.2%, respectively) and was significantly more frequent than in subjects with normal BMI (31.0%). Moreover, the subjects living in partner relationships were significantly ($p<0.05$) more frequently insufficiently active than those staying single (36.3 vs. 30.3%). Respondents who declared regular participation in leisure activities were less frequently insufficiently active (20.0%) and more frequently met the criteria of sufficient (37.6%), augmented (28.0%) or high (14.4%) level of physical activity. No significant effects were found with respect to education of respondents.

Conclusions. Prophylactic schedules associated with the improvement of physical activity level should be addressed particularly to females, people taking up recreation occasionally or to those not involved in recreation at all, living in partner relationships, youngest (21–30 years), in obese and overweight and in the lowest economic category.

Key words

physical activity, socioeconomic and demographic factors, IPAQ, adults

INTRODUCTION

The fast-paced changes in people's lifestyles that are associated with progress in economic development have a significant impact on the health of a population. The changes lead to improved living standards and increased access to new medical technologies; however, at the same time, the effects of a lack of physical activity and poor nutrition are very serious [1]. The epidemics of sedentary life [2] and obesity [3] concern the majority of people from developed countries. Chronic diseases and their increasingly strong relationship with disabilities [4] and premature death [5] are the results of sedentary lifestyles. Not without significance are the financial consequences that have created additional burdens on an already overloaded national health budget. The indirect costs of diseases related to low physical activity – associated with work absenteeism, medical visits, pensions, and reduced ability to work – are, in fact, very high among people of working age [6].

Physical activity is one of the most important indicators, although still underrated, of health, morbidity, and mortality [7]. There is convincing evidence that regular physical activity prevents overweight and obesity [8], while a sedentary lifestyle increases these diseases [9]. Therefore, health promotion and chronic disease prevention programmes advise moderate or vigorous physical activity on most days of the week [10]. Currently, according to the latest recommendations of the World Health Organization (WHO), healthy individuals, adults (18–64 years old) should participate [10] in the following:

- moderate physical activity ≥ 150 min./week;
- vigorous physical activity ≥ 75 min./week;
- the equivalent combination of moderate and vigorous physical activities.

The necessary amount of physical activity can be accumulated in at least 10-minute series and may consist of a combination of moderate and intensive physical activities. It is also recommended that exercise involving large muscle groups that increases muscle strength and endurance (≥ 2 days/week) should be included in physical activity.

With regards to people who are over 65-years-old, the same objectives as in the case of young and healthy adults are basically recommended. But for this group of people, weight training with the participation of the major muscle groups is very important (≥ 2 days/week), as well as balance exercises to help prevent falls (≥ 3 days/week), especially among people with poor mobility.

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Received: 10 May 2013; Accepted: 07 November 2013

Regardless of the obvious health benefits of regular physical activity during leisure time, most of the world's population, including Poles [11], do not perform the recommended amount of exercise [12]. Moreover, results presented by Biernat [13] show that even among highly educated people the percentage of those performing regular exercises is not satisfactory.

Current scientific data indicate a number of factors that could negatively impact the level of physical activity [14]. These factors include the complex interactions of social, economic, cultural and environmental variables however, the first step in developing effective prevention programmes is to recognize those factors. An attempt to determine general patterns of participation in sport, recreation and tourism, as well as physical activity levels of working Warsaw residents, was made previously [13]; however, the contributing factors were not deeply explored. The aim of the presented study, therefore, was to assess the relationships between selected socio-economic and demographic factors with particular levels of physical activity of men and women of working age residing in Warsaw.

MATERIALS AND METHOD

Study sample. The study sample comprised of 2,544 working residents of Warsaw, representatives of the following occupational groups: academic teachers, research fellows from research institutes, healthcare professionals, local and central government administrative staff, administrative and technical personnel (from universities, theaters, and institutes) and actors. The studied group consisted of persons aged 20–69-years-old (mean age = 41.8±11.4 years), the individual 10-year-intervals were almost evenly represented, while the fraction of the oldest subjects (above 60-years- old) was considerably lower (4.4%). Males accounted for 38.1% of the entire sample, and the majority of respondents had a diploma of higher education (70%) and were in stable relationships (65.1%). About 50% of respondents had normal BMI; overweight and obesity were found in 31.4 and 7.9% of subjects, respectively.

Sampling and organization of research. A two-stage, stratified random sampling system was used in the study. The first step was to select 3–10 institutions that employed people engaged in a particular profession from among all the institutions of that type in Warsaw. In the second stage, a certain number of people in each institution were selected. At institutions employing up to 35 workers, the study included the entire group present at work on the day of survey. In institutions employing or educating more than 35 people, a 30% sample group was selected, but limited to a maximum of 100 people. The respondents who over the period of seven days prior to the survey were sick, were in hospital, attended rehabilitation classes, or were on vacation, etc., were not included in the study.

In accordance with the rules adopted by the creators of the IPAQ, the study was only conducted in March and November (2008 and 2009) – which was beneficial for Polish conditions – according to the Institute of Meteorology, the average temperature and precipitation are similar in these months. These two months are not periods of increased physical activity (such as vacation), so that the measured physical activity can be defined as being habitual. The periods (usually a week) associated with holidays – All Saints' Day and Easter – if they happened at the time of the research – during which increased physical activity may occur (visiting cemeteries, visits, walks to church, etc.) were excluded from the research. The survey data were collected through standardized, direct interviews led by trained and supervised interviewers. The percentage of refusals to answer survey questions was relatively small, and ranged from 3–5% in individual occupational groups.

Research tools. The two above-mentioned questionnaires were used in this study. The first concerned recreational activity performed throughout the last year, where the recreation was defined as taking up in one's spare time and for one's pleasure various forms of recreation, e.g. jogging, fitness, body building, cycling, swimming, team games, etc. Based on the data collected, the character of respondents' participation in recreation (none, occasional, regular) was established. The second part of the questionnaire was a short version of the IPAQ, through which information was collected on the frequency and duration of all physical activities (intensive, moderate and walking) undertaken by respondents throughout the previous week. Vigorous physical activity was defined as effort lasting at least 10 minutes, such as lifting heavy loads, digging earth, aerobics, fast running, or fast cycling, resulting in heavily increased breathing and accelerated heart rate. Moderate physical activity was defined as average effort lasting at least 10 minutes, such as lifting lighter weights, cycling at a normal pace, playing volleyball, or very brisk walking, resulting in slightly increased breathing and accelerated heart rate. Walking was defined as movement while performing work or walking down a street, for example, to the shop, to work, or just strolling. Based on these parameters, and after standard calculations, the following categories of physical activity were distinguished:

- Insufficient – combination of activities accumulating total physical activity below 600 MET-minutes/week.
- Sufficient – combination of activities accumulating total physical activity below 1500 MET-minutes/week.
- Augmented – less than three days of vigorous activities accumulating total physical activity of at least 1,500 MET-minutes/week.
- High – three or more days of vigorous activities accumulating total physical activity of at least 1,500 MET-minutes/week.

Data on subjects who reported no activity were not included in the analysis.

During the direct interview, data regarding gender, age, education, body height and body mass, as well as material and marital status of the respondents were gathered. Based on body height and body mass, the BMI values were calculated, which served to classify the respondents into standard body mass categories (normal, underweight, overweight, obese). The respondents were also divided into those living in a relationship (marriage, concubinage) and those not living in partner relationships (widows/widowers, divorcees, singles). Due to the small number of subjects with primary education (1.2%) the analyses were limited to comparison of the two remaining (secondary, higher) education categories. The chi-square test (in logarithmic form) was used in the data analysis; the level of $p<0.05$ was considered significant.

RESULTS

Of the 2,544 studied subjects, 6% declared being complete sedentary, i.e. they did not report performing any physical activities; about 71% were females. Analysis performed among active subjects also showed that females, compared to males, were more frequently (p<0,05) insufficiently active (35.9 vs. 31.9%), while males tended (p=0.06) to meet more frequently the criteria for a high level of physical activity (7.3 vs. 9.4%). The percentages of males and females having sufficient or augmented physical activity were comparable and amounted to about 34 and 24%, respectively.

In obese and overweight subjects, insufficient physical activity predominated (42.9 and 36.2%, respectively), and was significantly more frequent than in subjects with normal BMI values (31.0%). Moreover, in the latter group, the augmented level of physical activity was significantly more frequent than observed in obese subjects (25.1 vs. 17.4%)(Fig.1).

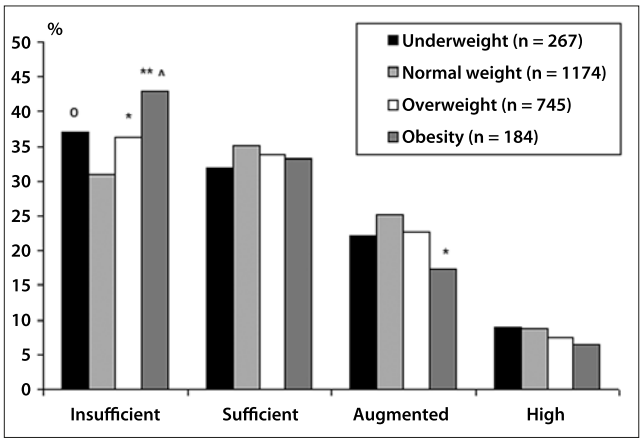

Figure 1. Percentages of subjects in particural physical activity levels, classified according to standard BMI categories.
Significantly different from normal weight: * p<0.05; **p<0.01; o nearly significantly (p<0.1); different from normal weight: ^ nearly significantly (p<0.1) different from overweight

Although the percentage of insufficiently active subjects increased with age -from about 31% in the 20–29 age group until about 39% in the 50–59 age group – surprisingly, the oldest subjects were least frequently classified as having an insufficient level of physical activity (22.5%). A reverse trend was observed for a sufficient activity level where the percentage of youngest subjects (37.6%) was significantly (p<0.05) higher than obtained for the 50–59 age group (31.6%). No significant age-related differences were found in the case of augmented and high physical activity levels (Fig. 2).

The analysis of relationships between economic status and physical activity revealed some significant between-group differences; namely, the percentage of insufficiently active subjects observed in the highest economic category (monthly income above €640) was significantly (p<0.001) lower (24.7%) than observed in other categories (about 37%). Moreover, subjects with the highest economic status were more frequently (p<0.05) sufficiently active (38.5%) compared with those in the lowest economic category (31.4%), and more frequently achieved higher activity levels than subjects who declared a monthly income of €500 – €640 (10.6 and 4.6%, respectively). The percentages of subjects within the augmented physical activity level were comparable for all economic categories and ranged from 22–26%.

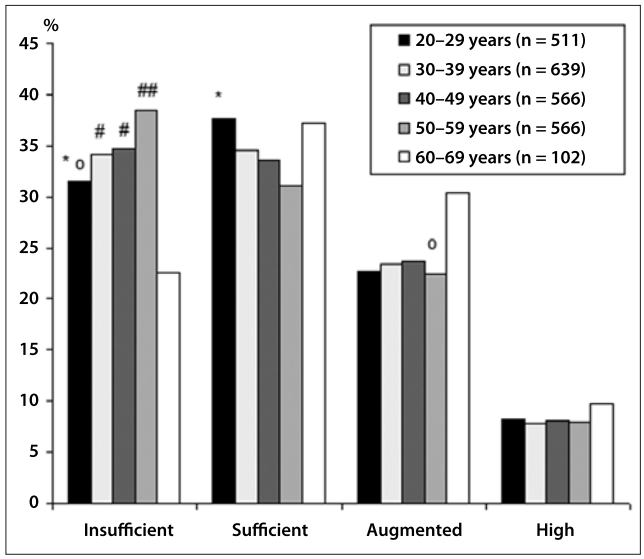

Figure 2. Percentages of subjects in particural physical activity levels, classified according to their age.
*significantly (p<0.05) different from 50–59 years; significantly (p<0.05) different from 60–69 years; #p<0.05; ##p<0.01; onearly significantly (p<0.1) different from 60–69 years.

It was found that regular participation in recreation significantly differentiates the subjects' levels of physical activity. The subjects who declared regular participation in leisure activities were less frequently insufficiently active (20.0%), and more frequently met the criteria of sufficient (37.6%), augmented (28.0%) and high (14.4%) level of physical activity, compared to respondents performing recreation occasionally, or to those not involved in any recreational activity (Fig. 3).

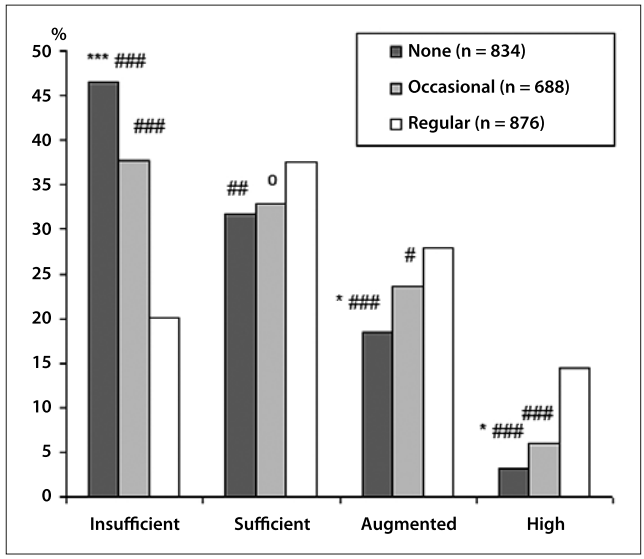

Figure 3. Percentages of subjects in particural physical activity levels, classified according to participation in recreaction.
Significantly different from occasional: *p<0.05; ***p<0.01; significantly different from regular: #p<0.05; ##p<0.01; ###p<0.01; onearly significantly (p<0.1) different from regular.

It was also revealed that subjects living in partner relationships were significantly (p<0.05) more frequently insufficiently active than those who remained single (36.3 vs. 30.3%), while in the case of sufficient activity, the situation was reversed – 32.6 and 37.4%, respectively. No

significant relationships were found between the education of respondents and levels of physical activity.

Detailed analyses with respect to gender and participation in recreation within individual physical activity levels were also carried out. It was found that irrespective of the physical activity category the percentage of underweight or normal weight females was significantly higher than observed in males. The most pronounced gender-related differences, amounting to 20%, were noticed in high physical activity and in insufficient physical activity categories for underweight and normal weight, respectively. On the other hand, overweight males prevailed in each of the physical activity categories by about 25%, while obesity was significantly more frequent among insufficiently active males only – 16.7 vs. 5.8%. As far as recreation is concerned, subjects regularly active were less frequently obese (3.3%) and underweight (8.7%), compared to those performing recreation occasionally – 8.1 and 15.5%, respectively; however, this was only true for the category of augmented physical activity. It was also found that in the insufficient, sufficient and augmented physical activity categories, the percentage of males having higher education was by about 18–24% higher than the respective fraction observed in females. The between-gender difference in high physical activity category was 10% but not significant. Similar observations were made with respect to participation of respondents in recreation, i.e. irrespective of the level of physical activity, the subjects who declared regular participation in leisure activities, more frequently ($p<0.01$) had a higher education than those not involved in recreation. These differences increased with the levels of physical activity and amounted to 13% and 23% in insufficient and high activity level, respectively. Similarly, it was found that within each physical activity level the percentage of subjects remaining single was significantly ($p<0.05$) higher in females, and these gender-related differences increased with the level of physical activity, from 7.5–11.4% in insufficient and high activity level, respectively. Unlike gender, no clear patterns were found with respect to subjects' marital status and engagement in recreation; namely, among those having insufficient or augmented level of physical activity, subjects who regularly participated in recreation were more frequently single, compared to those who declared no recreational activities; the respective fractions were 36.8 vs. 26.7% and 41.6 vs. 26.0%. In other categories of physical activity, no significant relationships were found between leisure time activities and subjects' marital status.

DISCUSSION

A sedentary lifestyle and lack of daily exercise is a worldwide public health problem [22]. This also concerns Polish people [23], and among the working residents of Warsaw in the age group 20–69, the percentage of insufficiently active people amounts to 32%, and those declaring a completely sedentary lifestyle, to about 6%. Females, compared to males, were more frequently insufficiently active (35.9 vs. 31.9%).

This does not change the fact, that nearly 62% of respondents did fulfill the pro-health recommendations with regards to physical activity. The result obtained among Warsaw residents was quite high, compared to the result presented by Ekelund et al. (2006) [24], although the residents of Warsaw are still far behind the Swedish population, where 75% met the WHO recommendations. In this respect, the residents of Warsaw do not differ the people of Western Europe and the United States [25, 26]. Among the French population [27], the recommended dose of physical activity is met by 62% of men and 52% of women. Among Americans, 50.7% of men and 47.9% of women undertake the recommended dose of physical activity [28]. Jones et al. claim [25] that 32% of adults undertake in leisure time moderate physical activity of 30 minutes or longer at least 10 times during a two-week period.

At the same time, the presented results are significantly different from previous studies conducted among the Polish population. The percentage of Poles who are characterized by low levels of physical activity is relatively low, much lower than in the results obtained by the Eurobarometer survey (46%) [29] and the WOBASZ study (over 50%) [11]. The explanation for this lies in the specificity of the studied group: respondents were residents of a large urban area; the majority of them belonged to professional groups that on an international occupational prestige scale, and the socio-economic scale of occupational status are recognized as having the highest positions. In addition, most of them had a higher education diploma. It can be stated that these people created a kind of elite, which is a model for the rest of society in terms of knowledge, behaviour, values and attitudes, as well as in terms of economic possibilities [13]. The studied group consisted of academic teachers, actors, as well as healthcare professionals (although in the case of the latter group, no association was found between knowledge about healthy behaviour and practice [30]).

The relationship between level of education and care for one's own physical condition seemed to be quite natural. Such a relationship was confirmed in a study conducted among bank employees in Łódź and Warsaw, Poland [31,32]. However, the well-known axiom [25,33]: the higher the level of education, the lower the proportion of people with low levels of physical activity, was not confirmed in the presented study. This may be due to the specificity of the studied group, i.e. the fact that the overwhelming majority of respondents had a higher education diploma and merely 1% of respondent had primary education, and for that reason were not included into the analysis. Higher education entailed not only more knowledge on how to take care of one's own health, but also the position in the occupational structure, which often requires creative approaches towards problems arising in the workplace [34]. The level of education shapes people's knowledge about the world and a person's place in it, it promotes the belief that everything that happens in the life of an individual – including health – is largely a consequence of the individual's own actions and choices [35]. A high level of education with the high requirements related to occupation: care of appearance and a high involvement in work, combined with good physical fitness and resistance to stress, contributed greatly to the decision to perform regular fitness activity [35]. Therefore, participating in recreational activity was declared by 65.2% of the studied working residents of Warsaw – 36.5% on a regular basis and 28.7% occasionally. It is obvious that any participation in sports activity – even periodic or sporadic – increases the level of physical activity [36]. Therefore, it is not surprising that people who regularly participate in physical recreation are more likely to achieve a high or moderate level of physical activity than those who do not participate in physical activity at all.

Conversely, passive recreational activities, e.g. watching TV, surfing the Internet, etc.) and daily professional work undertaken in a sitting position, mean many hours of physical inactivity, and consequently, the greater likelihood of obesity [37], cardiovascular disease [38] and abnormal posture [39]. Previous studies confirm that a sedentary lifestyle affects more and more people worldwide. In China, during only one decade, 1990–2000, physical activity associated with work decreased by 22% among males and 24% among females [40]. Similarly, physical effort undertaken at home decreased by 57% among males and by 51% among females [41]. The decrease in physical activity was followed by an increased percentage of people with overweight and obesity [42]. Long-term studies by Petersen et al. [43] proved that obesity might cause some limitations in mobility and lead to a deficiency of movement, a kind of 'vicious circle' – the lack of activity leads to obesity and obesity also affects physical activity. This is also confirmed by Polish reports. Obese bankers from Łódź were twice as likely to be physically inactive than those of normal weight. At the same time, the authors of the cited studies showed that half of the people in the studied group preferred passive leisure time activities [6]. Similar problems are found amongst Europeans [44], Brazilians [45], Colombians [46], and Americans [47].

It is very important to mention that the negative results of decreased physical activity often concern young people. Reports from China warned that the drastic decline in physical activity concerns all age groups [41]. Most of the existing analyses have pointed out that levels of activity decrease with age, both among males and females [48]. Among the residents of Łódź aged 55–64 years, the risk of being physical inactive during their spare time is twice as high than among the residents of the city aged 25–34 years [6].

In the presented study, the percentages of insufficiently active subjects increased with age; and inversely, those of sufficient activity decreased. Surprisingly, the oldest subjects were less frequently classified as insufficiently active and more frequently as sufficiently active, compared to younger respondents. Although there is evidence suggesting an increase in physical activity among older people [49], the observed phenomenon may be result of the perception of older respondents that physical activity undertaken by them is highly vigorous [50], or may be related with errors made while filling out the questionnaire [51]. In the presented study, however, strict compliance with all the methodological principles of the IPAQ minimalised the possibility of errors. However, it is possible that this trend was related to the very small sample of the oldest respondents, compared to the number of respondents in other groups. Nevertheless, the fact that seniors spent a greater amount of time actively is highly optimistic [52]. On the other hand, the relatively low physical activity among those aged 20–30 years is worrying. These are people at working age, and who they often continue to study. Bergier et al. [53] have already pointed out the decline in physical activity among young adults in Poland. The author showed that 20.8% of young people who are studying do not meet the recommendations of the World Health Organization. Allender et al. [54] pointed out the trend of decline in physical activity among people who progressed to a higher level of education. It seems that school education should have a more substantial impact on the physical culture of young people. School education should place greater emphasis on awareness of the health-related benefits of physical activity, and impress on students the habit of bodily regeneration [55].

CONCLUSIONS

The results of the presented study reveal that the level of physical activity among the working residents of Warsaw appears to be low, and does not reach the values recommended for the prevention of chronic diseases.

Prophylactic schedules associated with the improvement of the level of physical activity should be addressed particularly to females, people taking up recreation occasionally, and to those not involved in recreation at all, living in partner relationships, the younger age group (21–30 years), the obese and overweight and in the lowest economic category.

The behaviour of high prestige groups may create a model that will influence changes in lifestyles in Polish society.

Acknowledgments
This work was supported by the Joseph Pilsudski University of Physical Education and the Ministry of Science and Higher Education in Warsaw, Poland (Grant No. DS – 86, Project Leader, Assoc. Prof. A. K. Gajewski), and the Provost Fund of the Warsaw School of Economics.

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