

PHYSICAL ACTIVITY AND SELF-PERCEIVED HEALTH STATUS

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Abstract

Objectives: Recently more attention has been focused on the impact of physical activity on modification of self-perceived health status in adults. The objective of the study was to evaluate the level of occupational and non-occupational physical activities and their correlation with self-perceived health status among economically productive individuals. **Materials and Methods:** Physical activity of the subjects studied was evaluated by the Seven Day Physical Activity Recall (SDPAR) questionnaire among randomly chosen residents of the city of Łódź (n = 598, including 299 women and 299 men). The examination of the subjective health assessment was conducted based on the analogue visual scale. **Results:** The multifactorial logistic regression analysis indicated that weekly energy expenditure on occupational physical activity (kcal/week) did not play a significant role in self-perception of health status among men or women. Neither did the outcome of the study provide evidence for the significant effect of housework load on self-perceived health status among the study participants. However, a sufficient level of leisure-time physical activity in a beneficial way affects health-related self-perception of the examined subjects. In the group of men expending 1000 kcal/week or more on leisure-time physical activity, the risk for poor health-related self-report was significantly lower than among men declaring no energy expenditure on this activity (adjusted odds ratio (OR) = 0.29, 95%CI: 0.13–0.66). Among females not taking up any recreational physical activity, the risk of low self-perceived health status was also higher than in females reaching a satisfactory level of recreational physical activity (adjusted OR = 0.38, 95%CI: 0.17–0.87). **Conclusions:** Preventive programs aimed at improving subjective health assessment through the increased leisure-time physical activity should be addressed to all economically productive individuals and particularly to people of older age groups and above all to females.

Key words:

Self-perceived health status, Occupational physical activity, Housework physical activity, Leisure-time physical activity, Adults

INTRODUCTION

According to the definition of the World Health Organisation (WHO) health does not only mean lack of disease or disability, but the peak of human potentials in physical, psychic and social functioning, which confirms the usefulness and need for further studies on self-perceived health status [1]. It should be emphasized that subjective health

assessment takes account not only of the state of somatic but also of psychic health. Moreover, it reflects the capability of adults to function in a definite social and organizational situation, including work requirements. In recent studies, subjective assessment of health has been found to highly correlate with the results of its objective assessment and health status indices [2–5]. Furthermore, self-percep-

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tion of one's own health is regarded as a prognostic indicator of the prevalence of various chronic diseases, affecting their prognosis [6,7]. Quite important is also subjective awareness of one's own health in creating work ability of people in economically productive age. Individuals with low values of self-perceived health status more frequently make use of medical services and have higher absence from work as compared to those with opposite attitude towards their health [5].

Subjective health assessment along with objective methods has been widely used to evaluate health status and effectiveness of preventive programs also involving those performed in the work environment [8,9]. This method is quite inexpensive, relatively uncomplicated and thus frequently incorporated into investigations on large populations, including population of Poland [10,11].

Recently, much interest has been focused on the impact of physical activity on modification of subjective health assessment in adults [12]. Numerous studies indicate the significance of leisure-time physical activity in the creation of the adults' self-perceived health status. However, little attention has been paid to the role of occupational physical activity and other everyday activities in relation to this problem [11].

It has been proved in various studies that physical activity can significantly diminish the risk of cardiovascular diseases, overweight, obesity, diabetes and some neoplastic growths [13]. An adequate level of physical activity leads to a decrease in general and cardiovascular disease-induced mortality [14,15]. However, not all studies confirm its beneficial effect on health status of the examined subjects [16,17]. In investigations carried out to date, the effect of the level and type of the undertaken physical activity on health status has been emphasized. The majority of studies evidence that leisure-time physical activity is the type of activity that exerts a positive influence on health. For health promotion and prevention of chronic diseases, endurance training of moderate intensity (60% to 75% max heart rate) at least 4–5 times weekly for 30–45 min is recommended. Energy expenditure on exertion should exceed 1000 kcal/week [18]. Apparently, the studies on the effect of physical activity on health are not univocal. Some

of them depict that heavy physical work can elevate the hazard of cardiovascular and other civilization diseases or even mortality, while performing mental work positively affects health status [19–21].

The aim of this study was to evaluate occupational and non-occupational physical activities (including leisure-time and housework activity) and their correlation with self-perceived health status among occupationally active individuals.

MATERIALS AND METHODS

The study was performed in the randomly selected population of occupationally active individuals. The analysis was performed in a group of 598 fulltime workers, including 299 men and 299 women. The selection was made by the Local Data Bank in Łódź that rendered the data available with the proportional draw scheme. As an operator the personal identification number (in Polish PESEL) was used.

Physical activity was determined by the interviewer-administrated Seven Day Physical Activity Recall (SDPAR) questionnaire [22,23]. The questionnaire provided data concerning the frequency, intensity and length of both occupational and leisure-time physical activity seven days prior to the examination. It also permitted to collect data on the number of hours of physical activity with low (1.5 METs – metabolic equivalents), moderate (4 METs), high (6 METs) and very high (10 METs) intensity, and energy expenditure during sleep (1 MET). Thus, daily or weekly energy expenditure during physical activity could be calculated (kcal/day, kcal/week), depending on the type of activity performed. To evaluate recreational physical activity three categories were considered: lack of physical activity, unsatisfactory and satisfactory physical activity relative to health. In men, it corresponded to weekly energy expenditure on leisure-time physical activity of 0 kcal/week, 0–1000 kcal/week, >1000 kcal/week, and in women of 0 kcal/week, 0–750 kcal/week and >750 kcal/week, respectively. The latter value was considered a satisfactory level of recreational physical activity. Occupational physical activity was also analyzed in

three categories: light, medium heavy and heavy, which, among men, corresponded to weekly energy expenditure on work of <4000 kcal/week, 4000–7500 kcal/week, >7500 kcal/week, whereas in women <3500 kcal/week, 3500–5000 kcal/week and >5000 kcal/week, respectively. Moreover, housework was assessed in three categories of energy expenditure. Among men it was 0 kcal/week, 0–1200 kcal/week, >1200 kcal/week, and among women – 0 kcal/week, 0–2400 kcal/week, >2400 kcal/week. In subjective health assessment an analogue visual scale was used as a supplement to physical activity questionnaire [24–26]. This scale is derived from the Polish version of the international standardized questionnaire EuroQol 5D assessing the quality of life. Based on the analogue visual scale the subjects assessed their health in the range from 0 (the worst imagined health status) to 100 scores (the best possible health status). According to this scale the scores from 0 to 40 represented a poor state of health. Furthermore, while interviewing, the data on occupation, the level of education, income, marital status and smoking were collected.

Statistical analysis

For the statistical analysis of the longitudinal variables, their range (minimum–maximum), mean values (arithmetic mean and median) and also standard deviation were calculated. To compare the frequency of the given categories of quantitative characteristics in the analyzed groups the chi-square test or the Chi-square test with Yates' correction was used. The distribution of measurable characteristics was analyzed using the Shapiro-Wilk test. To compare the mean values between two groups in relation to the type of distribution, the test for two independent trials or the Mann-Whitney test was applied. A significance level was established at $p = 0.05$ for the values included in the critical region of a given distribution. For identification of risk of low health self-assessment, the logistic regression analysis was performed. At the first stage, crude coefficients – odds ratios (OR) of the impact of odd variables on the low self-perceived health status in the men and women were calculated. Subsequently, the multifactorial analysis, considering simultaneous effect of all variables

on the risk of low self-perceived health status in the subjects examined, was employed. All p values were two-sided and $p < 0.05$ was set as statistically significant. The statistical analysis was done with use of the STATGRAPHICS plus 5.1 program.

RESULTS

Based on the information taken on interviewing, the subjects were characterized by means of basic anthropometric indices: body mass, height, body mass index (BMI) and selected socio-economic variables (Table 1).

The analysis of self-perceived health status indicated that the subjects assessed their health (0–100 score scale) approximately for 68.0 ± 19.8 scores. Males evaluated their health slightly higher as compared to females: 70.9 ± 17.3 scores vs. 68.3 ± 18.4 scores ($p < 0.01$). The distribution of health-related self-perception demonstrates that as many as 8.3% of females and 5.6% of males considered their health as poor (< 40 scores).

Table 1 gives a detailed characteristics of leisure-time, occupational and housework physical activities (kcal/week) in men and women. The analysis of the type of physical activity revealed that women were more engaged in housework activities than men. Obviously, in the male group as compared to females high intensity occupational physical activity was more frequent.

The analysis of the impact of odd variables on the low self-perceived health status in men showed that the age over 45 years, low educational level, low income, current or past smoking, and working longer or shorter than 40 to 42 h/week had a significant, negative effect on self-perceived health status. However, a sufficient level of leisure-time physical activity beneficially influenced health-related self-perception of the examined males. Corresponding features had a significant impact on self-perceived health status in females. In women, overweight, obesity, medium heavy and heavy work were also associated with a higher risk of poor subjective health assessment. The results of multifactorial logistic regression indicate that age had a significant impact on self-perceived health status in men and women (Tables 2 and 3). Among men aged 55 years, the risk for

Table 1. Characteristics of the study population (mean values and distributions in percent)

Characteristics	Men (n = 299)	Women (n = 299)	Men vs. women
Age (years)	43.2 ± 10.83	42.57 ± 10.50	p > 0.05
≤35	28.1	30.8	
36–45	29.8	38.8	
46–55	15.7	27.8	
>55		12.7	
Self-perceived health status	70.9 ± 17.3	68.3 ± 18.4	p < 0.01
Poor	5.6	8.0	
Fair	29.1	32.1	
Good	42.8	39.2	
Very good	22.4	20.4	
Education level			
Primary/Secondary	30.1	21.7	p < 0.05
High school	40.1	40.5	
University	29.8	14.0	
Body mass index (BMI) (kg/m ²)	26.5 ± 3.7	24.3 ± 4.3	p < 0.001
<25	35.8	63.9	
25–30	40.5	22.1	
>30	23.7	14.0	
Smoking status			
Never smoked	28.43	42.17	p < 0.001
Former smoker	29.10	22.74	
Current smoker	42.47	35.12	
Mean number of hours on sleep/day			
≤ 5h	10.70	8.3	p > 0.05
5.1–7.9	59.87	59.5	
≥ 8	29.43	41.1	
Mean number of hours on TV watching/day			
to 1	24.75	24.08	p > 0.05
to 2	26.4	30.1	
to 3	23.4	23.7	
4 and more	25.4	22.1	
Housework activities			
Lack	37.1	15.0	p < 0.001
Medium level	29.1	43.8	
High level	33.8	41.1	
Income level			
Very good	26.42	24.41	p > 0.05
Sufficient	46.49	44.15	
Poor	27.09	31.44	
Leisure-time physical activity			
Lack	51.8	59.5	p > 0.05
Insufficient level	27.1	24.7	
Satisfactory level	21.1	15.7	
Weekly number of hours on work			
<40	15.7	22.1	p > 0.05
40–42	42.8	41.5	
>42	41.5	36.4	
Job characteristics			
Light work	63.5	84.3	p < 0.001
Medium heavy work	16.7	12.7	
Heavy work	19.7	3.0	

Table 2. Odds ratios (OR) and 95% confidence intervals (CI) for poor self-perceived health status to selected variables (values under median) in men

Variables	Odds ratios and 95% confidence intervals		
	Crude OR	Multifactorial analysis (adjusted OR)	
		"Enter" method	Statistically significant variables
Age (years)			
≤35	1	1	1
36–45	0.96 (0.48–1.89)	0.83 (0.37–1.85)	0.79 (0.37–1.70)
46–55	1.89 (1.00–3.58)	1.84 (0.84–4.03)	1.78 (0.86–3.70)
>55	2.77 (1.31–5.85)	2.85 (1.10–7.43)	2.84 (1.17–6.91)
Education level			
University	1	1	
High school	1.83 (0.99–3.36)	1.05 (0.46–2.40)	
Primary/Secondary	2.23 (1.17–4.22)	1.55 (0.62–3.87)	
Body mass index (BMI) (kg/m ²)			
<25	1	1	
25–30	0.87 (0.40–1.53)	0.85 (0.41–1.76)	
>30	1.89 (1.02–3.51)	1.95 (0.88–4.33)	
Smoking status			
Never smoked	1	1	1
Former smoker	3.72 (1.72–8.07)	4.02 (1.58–10.23)	3.58 (1.52–8.44)
Current smoker	6.62 (3.21–13.68)	8.21 (3.47–19.46)	7.76 (3.50–17.25)
Housework activities			
Lack	1	1	
Medium level	0.93 (0.52–1.69)	1.49 (0.71–3.12)	
High level	0.94 (0.53–1.66)	1.30 (0.65–2.60)	
Mean number of hours on TV watching/day			
to 1	1	1	
to 2	1.41 (0.73–2.76)	1.01 (0.43–2.34)	
to 3	0.78 (0.38–1.59)	0.58 (0.24–1.41)	
4 and more	1.35 (0.69–2.66)	0.81 (0.35–1.87)	
Mean number of hours on sleep/day			
≤ 5	1	1	
5.1–7.9	1.01 (0.29–3.58)	1.56 (0.60–4.03)	
≥ 8	1.09 (0.33–3.59)	1.35 (0.49–3.75)	
Income level			
Very good	1	1	
Sufficient	1.83 (0.98–3.41)	1.29 (0.59–2.81)	
Poor	2.40 (1.22–4.75)	1.28 (0.52–3.13)	
Leisure-time physical activity			
Lack	1	1	1
Insufficient level	0.77 (0.44–1.35)	0.90 (0.45–1.80)	1.08 (0.57–2.02)
Satisfactory level	0.29 (0.14–0.61)	0.26 (0.10–0.65)	0.29 (0.13–0.66)
Weekly number of hours on work			
<40	2.43 (1.21–4.89)	2.76 (1.11–6.88)	3.27 (1.40–7.65)
40–42	1	1	1
>42	1.81 (1.06–3.08)	2.20 (1.15–4.22)	1.98 (1.09–3.60)
Job characteristics			
Light work	1	1	
Medium heavy work	1.10 (0.58–2.10)	0.84 (0.36–1.95)	
Heavy work	0.79 (0.42–1.48)	0.53 (0.24–1.18)	

Table 3. Odds ratios (OR) and 95% confidence intervals (CI) for poor self-perceived health status to selected variables (values under median) in women

Variables	Odds ratios and 95% confidence intervals		
	Crude OR	Multifactorial analysis (adjusted OR)	
		"Enter" method	Statistically significant features
Age (years)			
≤35	1	1	1
36–45	3.49 (1.77–6.89)	2.41 (1.10–5.28)	2.80 (1.34–5.85)
46–55	4.10 (2.07–8.13)	2.63 (1.16–5.93)	2.77 (1.31–5.89)
>55	8.48 (3.61–19.97)	7.70 (2.76–21.48)	8.34 (3.28–21.18)
Education level			
University	1	1	1
High school	1.72 (0.99–2.98)	0.97 (0.48–1.94)	1.16 (0.62–2.18)
Primary/ Secondary	3.80 (1.99–7.24)	1.96 (0.82–4.67)	2.56 (1.23–5.33)
The level of income			
Very good	1	1	
Sufficient	1.72 (0.92–3.22)	1.35 (0.62–2.92)	
Poor	2.77 (1.43–5.33)	1.28 (0.54–3.01)	
Body mass index (BMI) (kg/m ²)			
<25	1	1	
25–30	1.91 (1.08–3.39)	0.89 (0.57–1.81)	
>30	2.99 (1.50–5.95)	1.18 (0.47–2.96)	
Smoking status			
Never smoked	1	1	1
Former smoker	2.27 (1.21–4.28)	1.80 (0.85–3.81)	1.56 (0.77–3.16)
Current smoker	4.09 (2.33–7.17)	3.59 (1.84–7.01)	3.33 (1.79–6.20)
Housework activities			
Lack	1	1	
Medium level	0.80 (0.40–1.63)	0.88 (0.37–2.12)	
High level	1.57 (0.78–3.16)	1.59 (0.65–3.88)	
Mean number of hours on TV watching/day			
to 1	1	1	
to 2	0.79 (0.41–1.52)	0.54 (0.24–1.20)	
to 3	1.45 (0.74–2.83)	0.95 (0.41–2.18)	
4 and more	1.48 (0.75–2.92)	0.67 (0.27–1.63)	
Mean number of hours on sleep/day			
≤ 5	1	1	
5.1–7.9	0.69 (0.30–1.60)	0.68 (0.26–1.81)	
≥ 8	0.44 (0.18–1.08)	0.51 (0.18–1.44)	
Leisure-time physical activity			
Lack	1	1	1
Insufficient level	0.71 (0.40–0.22)	0.57 (0.27–1.21)	0.61 (0.31–1.18)
Satisfactory level	0.58 (0.27–0.13)	0.33 (0.13–0.82)	0.38 (0.17–0.87)
Weekly number of hours on work			
<40	1.75 (0.95–3.24)	1.66 (0.78–3.53)	
40–42	1	1	
>42	1.78 (1.04–3.04)	1.80 (0.93–3.50)	
Job characteristics			
Light work	1	1	
Medium heavy work	2.15 (1.08–4.29)	1.21 (0.48–3.03)	
Heavy work	6.09 (1.23–30.11)	1.91 (0.29–12.41)	

worse health self-report was nearly 3-fold higher than in men aged 25–34 years (adjusted OR = 2.84, 95%CI: 1.17–6.91). Among females in the 55–64 age group, the risk of a low subjective health assessment was 8-fold higher than in females under the age of 34 years (adjusted OR = 8.34, 95% CI: 3.28–21.18).

Moreover, self-perceived health status was found to be negatively correlated with smoking habit in the study participants. In the male former and current smokers, the risk of poor health self-report was significantly higher as compared to men who never smoked (adjusted OR = 3.58, 95%CI: 1.52–8.44 vs. adjusted OR = 7.76, 95%CI: 3.50–17.25). In the women, self-perceived health status was not associated with former smoking. But among currently smoking women, the risk of poor self-perceived health status was over 3 times higher than in never smoking females (adjusted OR = 3.33, 95%CI: 1.79–6.20). Furthermore, among the women the level of education was significantly correlated with subjective health status. Among women with primary education the risk of poor self-perceived health status was 2.5 times higher than in women with university education (adjusted OR = 2.56, 95%CI: 1.23–5.33).

The evaluation of relationship between energy expenditure on leisure-time physical activity (kcal/week) and subjective health assessment among the subjects demonstrated a statistically significant correlation (Table 3). In the group of men expending 1000 kcal/week or more on leisure-time physical activity, the risk for poor health-related self-report was significantly lower than among men declaring no energy expenditure on physical activity (adjusted OR = 0.29, 95%CI: 0.13–0.66). Among women not taking up any recreational physical activity, the risk of low self-perceived health status was also lower than in those reaching a satisfactory level of recreational physical activity (adjusted OR = 0.38, 95%CI: 0.17–0.87) (Table 3).

The multifactorial logistic regression analysis indicated that weekly energy expenditure on occupational physical activity (kcal/week) did not play a significant role in self-perception of health status among men or women. Neither did the outcome of the study provide evidence for the significant effect of housework load on self-perceived health

status among the study participants (Tables 2 and 3). Moreover, no statistically significant correlation between the level of self-perceived health status and the socio-economic variables was found.

DISCUSSION

The participants of the study scored their own health status approximately 68.0 ± 19.8 , which accounts for the values slightly lower as compared to those determined by Kwaśniewska et al. [11] in the study of the Polish urban population (74.6 ± 16.0). However, it should be emphasized that in the aforesaid study the subjective health assessment of younger individuals (aged 18–64 years) was analyzed by comparing them with the individuals aged 25–64 years involved in the present investigation. It is worth pointing out that subjects studied in the western European countries evaluate their health status much higher (e.g., 82.5 scores in Great Britain) than residents of Łódź [26,27]. A worse socio-economic situation in Poland seems to be responsible for this situation as compared to inhabitants of Western Europe [28].

The SDPAR questionnaire and subsequent calculations of energy expenditure in the examined individuals were conducted in accordance with the original formula [29]. The results of the study present a considerable spread of sedentary life style among the people at economically productive age. Moreover, the outcome of the CINDI WHO investigation “Bridging the East-West Health Gap” has provided comparable findings of physical activity evaluation among the adults in Poland [30]. This investigation was performed in the years 1996–1999 among inhabitants of six countries of Central and Eastern Europe: Finland, Germany, Hungary, Poland, Russia, and Spain. It was estimated that as many as 70% of Poles did not undertake any physical exercises, and approximately 10% undertook them only sporadically (less than once a week). A total of 6.4% of the subjects examined were characterized by high physical activity. Drygas et al. [30] reported that 11% of their study participants claimed they had not taken up any physical activity due to physical exertion performed at work, which replaced their leisure-time physical exercises.

In studies carried out to date, the highest percentage of respondents declaring high physical activity of a recreational nature has been noted in Finland (29.9%), Germany (19.9%), Spain (17.6%), Russia (13.9), and the lowest in Poland (6.4%) and Hungary (6.9%) [30].

The results of the current study reveal that the level of recreational physical activity clearly shaped a subjective health assessment in the study population. The analysis of self-assessment in relation to the physical activity level indicated that taking up physical activity of a sports-recreational nature in the recommended amount has a significant effect on self-perceived health status. Moreover, the recently published study on subjective health status and selected quality of life parameters in healthy individuals and those with genetic risk factors of chronic diseases has pointed to a strong association between insufficient physical activity and a lower self-perceived health status as well as worse quality of life parameters, regardless of the actual health status of the subjects examined [10]. In this research work the subjects taking regular physical exercises at least 2–3 times a week for a minimum of 30 min much better assessed their health as compared to those who were leading a sedentary life style [10].

Furthermore, it should be emphasized that a statistically significant correlation between smoking habit and poor self-perceived health status was recorded in both men and women. Among male current smokers, the risk of low subjective health perception was about eight times and among females over three times higher. Other studies also confirm a negative relationship between smoking and subjective health state [10,26,27].

After full adjustment no correlation between the high physical workload and poor self-perceived health status was found. However, not all studies confirm the positive influence of physical workload on health status of objectively examined subjects [16,17]. Numerous studies reveal that physical activity can play an important role in primary prevention of cardiovascular diseases, but some studies, have suggested the negative influence of high physical exertion on the risk of this category of diseases, including myocardial infarction [19–21]. Some of them also indicate that among blue-collar workers, particularly those

who work hard, reluctance to participate in leisure-time physical activity is quite common [19]. Our study results are rather limited and cannot solve this problem. However, people who sustain more physical workload at their jobs have a higher self-perceived health status probably because only healthy people are able to perform physical work. These results may perhaps reflect so called healthy worker effect.

The findings of the present study emphasize the need for targeting programs increasing recreational physical activity at older people and particularly at women who usually evaluate their health status lower than men. As literature data show, the benefits associated with taking up leisure-time physical activity do not consist only in the improvement of subjective work abilities and well-being, but also in the reduction of numerous risk factors for developing cardiovascular diseases [31].

CONCLUSIONS

1. The results of the current study reveal that residents of Łódź evaluate their health status lower than inhabitants of Western Europe.
2. Leisure-time physical activity exerts an advantageous impact on self-perceived health status among study participants.
3. Self-perceived health status was found to be negatively correlated with age and smoking habit in both men and women.
4. In this study no significant effect of occupational and housework physical activity on shaping of self-perceived health status in the examined subjects was observed.

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