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## Does past participation in competitive sports affect the relationships between socioeconomic factors and self-rated health: study randomly selected Polish male and female former athletes and non-athletes

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**Keywords:** former athletes, health inequalities, male, female, socioeconomic position, subjective health

### Abstract

**Objectives:** Identifying patterns of associations between self-rated health (SRH) and socioeconomic factors in male and female former athletes and non-athletes, and verifying if these associations are modified by the factors which characterize former athletes' past sport participation.

**Methods:** The data used came from Former Athletes' Lifestyle Project conducted among former athletes (N=351) and non-athletes (N=466) aged 18-66 years randomly selected from three regions of Poland. Anonymous questionnaires regarding SRH, socioeconomic variable, and factors which characterize former athletes' past sport participations (competitive sports training experience, sport level achieved in the past, and period of time since the end of sports career) were used. SRH was categorized as negative (average, poor or very poor) and positive (good or very good). Multiple logistic regression analyses were used to calculate the odds ratios of negative SRH after adjusting for socioeconomic and sports characteristics.

**Results:** Groups former athletes and non-athletes exhibited different patterns of relationships between SRH and socioeconomic variables. In both male and female non-athletes the higher risks of negative SRH were significantly associated with low socioeconomic position. Short time from ending sport careers significantly reduced the risk of negative SRH in both male and female former athlete.

**Conclusions:** Among men and women former participation in competitive sports limits the adverse effect of socioeconomic status on SRH. For this reason it appears to be appropriate to incorporate popularization of competitive sport as one of the strategies of public health indirectly oriented towards reduction in socioeconomic inequalities in health.

## Introduction

Self-rated health (SRH) has been widely used in population surveys to measure health status. SRH reflects, in an integrated manner, physical, psychical and social disposition, which is frequently concealed during external observations, thus it can be a more susceptible indicator in health status monitoring compared to external measures [1, 2]. It provides an indicator of chronic illness and disability [3, 4, 5, 6, 7, 8], and a predictor of future mortality rate [9, 10, 11, 12], also after assessment of the effect of age, socioeconomic status (SES), marital status, results of medical examinations, ability to perform self-care activities, and psychosocial variables.

Many previous studies on correlates SRH have been conducted in general adult populations. These studies have demonstrated that perception of health status as bad is correlated with females, older age, low SES [13, 14, 15, 16, 17, 18], and unhealthy behaviours [19, 20]. Only few studies have examined SRH in special populations, e.g. former athletes (FAs). The results of these studies show that FAs` self-rated health is considered to be better compared to the controls [21, 22, 23]. One of the explanations of FAs` high SRH can be their healthy lifestyle: high physical activity in leisure time in both men and women [22, 24, 25, 26, 27], and men`s low alcohol [28], and tobacco consumption [22, 27, 29]. In contrast to those researches, results of a study of Finnish elite male FAs suggest that former athletes` higher SRH compared to their peer controls in their senior years was not completely explained by their physical activity and healthier lifestyles. The authors also found that the socioeconomic status is important [22].

The present state of scientific investigations does not provide a clear-cut answer to the question of whether participation in competitive sport is likely to reduce both men`s and women`s risk of negative SRH in the following decades of life and whether they minimize the adverse effect of unfavourable socioeconomic position on their SRH.

The present study aims to examine the associations between SRH and socioeconomic factors in subgroups of male and female FAs and non-athletes (NAs), and to verify if these

associations are modified by the factors which characterize former participation in competitive sport.

## **Methods**

### ***Participants and procedure***

The study forms part of the 'Former Athletes' Lifestyle Project' conducted by the University School of Physical Education in Poznań, the Branch Faculty of Physical Culture in Gorzów Wielkopolski, Poland. The FA subject was defined as a person who had participated in training schemes and competitions as a member of sports clubs [24], and the NA subject was defined as person who had never matched the definition of an athlete provided by Telama et al. [24]. The study covered a period from May to June in 2003 (FAs) and 2004 (NAs). Random sampling of adults from three regions was employed in the study. A detailed description of sampling procedures for FAs and NAs was presented in previous studies [29, 30].

The study was approved by the Ethics Committee, and all the participants gave informed consent by returning the questionnaires, which were accompanied by cover letter explaining the purpose of the study [31].

353 of 477 questionnaires sent to FAs were responded (response rates: total: 74%; women: 74.9%, men: 72.6%). Two forms were incomplete, which caused that they were excluded from further analysis. Age of FAs respondents ranged from 18 to 66 years. They practiced 26 types of sports in total, mainly team sports.

Of 900 questionnaires sent to NA respondents, 479 were returned (response rates: total: 53.2%, women: 54.6%, men: 52.8%). Twelve forms were obtained from respondents aged over 66 years. These questionnaires were excluded from statistical analysis because of the age which differed from the group of FAs. One form was rejected because it was filled out unreliably. 466 questionnaires were adopted for further evaluation (231 sent by women and 235 by men).

Anonymous postal questionnaires contained closed-ended questions which related to SRH, socioeconomic status (SES), health-related behaviours, and former participation in competitive sports. All the data collected in this study were self-reported by the respondents. Our article is based on data regarding SRH, SES, and past participation in competitive sports.

## ***Measures***

1/ Global SRH was measured with one question: ‘How do you rate your health in general?’ There were five response options: very poor, poor, fair, good, very good.

2/ Socioeconomic factors:

- gender: (0) male, (1) female;
- age (years): (0) 18-34, (1) 35-50, (2) 51-66;
- place of residence: (0) rural area, (1) town, fewer than 100,000 inhabitants, (2) city, with 100,000 or more inhabitants;
- marital status: (0) unmarried (single, widowed, divorced); (1) married or living as married;
- education level: (0) primary or incomplete primary, (1) vocational, (2) secondary, (3) college, (4) master’s degree. Since there were no people with incomplete primary education level and low number of the respondents in categories of primary education and college, the following categories were included in the statistical analysis: (0) primary or vocational, (1) secondary, (2) higher (college or master’s degree).
- occupation: (0) student, (1) blue-collar worker, (2) white-collar worker, (3) non-professional (unemployed, pensioner and old-age pensioner, housewife, women on maternity leave).
- net monthly income per household member before the survey: (0) ≤ 300 PLN, (1) 301-600 PLN, (2) 601-900 PLN, (3) 901 PLN and more.

3/ Information on former participation in competitive sports (sport variables):

- competitive sports training experience (years): (0) ≤ 6 years, (1) 7-12 years, (2) 13 – 19 years, (3) 20 years and more;
- sport class achieved in the past: (0) 2nd class, (1) 1st class, (2) national master class (NM), (3) international master class (IM).
- period of time since the end of participation in competitive sports (years): (0) ≤ 5 years, (1) 6-10 years, (2) 11-15 years, (3) 16-20 years, (4) over 20 years.

## ***Statistical analysis***

The data obtained from the survey were divided into four subgroups: female FAs, male FAs, female NAs and male NAs. The respondents were dichotomised in our analyses: individuals reporting very poor, poor or fair health were classified as having negative SRH, coded with (0), those reporting good or very good health were classified as having positive SRH, coded with (1). Logistic regression analyses for multivariate models were used in order to identify the factors significantly correlated with SRH (the dependent variable). Independent

variables were: 1/ in both FAs and NAs: age, place of residence, education, occupation, marital status, and net income/person/month, 2/ in FAs also: competitive sports training experience, sport class, and period of time since the end of participation in competitive sport. At the first stage of analysis of logistic regression, crude odds ratios (CORs) and the corresponding 95% confidence intervals (CIs) were calculated. Next stages involved consecutive reduction of variables with the highest p-value from multivariate models. Results of the multivariate analyses for the models are presented as odds ratios (ORs) and their 95% confidence intervals (CIs). No interaction effects were considered. Goodness-of-fit for the adjusted models were assessed using a Likelihood Ratio chi-square test. Verification of statistical hypotheses was carried out for a significance level of  $p < 0.05$ . Statistica 10.0 PL Software and MS Excel 2000 Software were used for statistical analysis of the collected material.

## Results

Male and female FAs were significantly younger, better educated, more often married and white-collar workers, and less frequently blue-collar workers and non-professional than male and female NAs. The male and female FAs rated their subjective health to be better than the NAs did (Table 1).

**Table 1.** Distribution of socioeconomic (SES) and self-related health (SRH) by gender and past participation in competitive sports (in %)

SES and SRH	Categories	Females			Males		
		FA N=158	NA N=231	p *	FA N=193	NA N=235	p *
Age (yrs)	18 – 34	54,4	44,2	<b>0,049</b>	45,6	37,0	0,072
	35 - 50	39,9	30,7	0,061	43,5	30,2	<b>0,005</b>
	51 – 66	5,7	25,1	<b>&lt;0,001</b>	10,9	32,8	<b>&lt;0,001</b>
Place of residence	Rural area	13,3	9,5	0,241	13,0	15,7	0,430
	Town	51,9	59,3	0,149	54,9	51,9	0,536
	City	34,8	30,3	0,351	32,1	30,2	0,673
Education level	Elementary/vocational	2,5	22,1	<b>&lt;0,001</b>	8,8	34,5	<b>&lt;0,001</b>
	Secondary	45,6	49,4	0,461	42,0	39,6	0,615
	Higher	51,9	28,6	<b>&lt;0,001</b>	49,2	26,0	<b>&lt;0,001</b>
Occupation	Student	10,1	25,5	<b>&lt;0,001</b>	9,8	16,2	0,053

	Bleu-collar worker	13,3	21,2	<b>0,047</b>	21,8	31,1	<b>0,031</b>
	White-collar worker	67,7	33,3	<b>&lt;0,001</b>	54,9	27,2	<b>&lt;0,001</b>
	Non-professional	8,9	19,0	<b>0,006</b>	13,5	25,5	<b>0,002</b>
Marital status	Unmarried	37,3	51,9	<b>0,005</b>	29,0	46,0	<b>&lt;0,001</b>
	Married/living as married	62,7	48,1	<b>0,005</b>	71,0	54,0	<b>&lt;0,001</b>
Net income / person / month	≤ 300 PLN	13,3	10,8	0,454	8,3	8,5	0,941
	301 – 600 PLN	39,9	52,8	<b>0,013</b>	44,6	52,3	0,113
	601 – 900 PLN	32,3	24,7	0,101	28,5	22,1	0,129
	901 PLN and more	14,6	9,5	0,123	18,7	15,7	0,412
SRH	Very good	38,0	26,4	<b>0,016</b>	40,9	34,5	0,174
	Good	50,6	49,4	0,816	48,7	34,9	<b>0,004</b>
	Fair	9,5	22,5	<b>0,001</b>	7,8	26,8	<b>&lt;0,001</b>
	Poor and very poor	1,9	1,7	0,884	2,6	2,6	1,000

Note: \* *p*-value for the two-side two-element structure test

Distribution of sports characteristics did not differ between male and female FAs (Table 2).

**Table 2.** Distribution of sport variables by gender (in %)

Sport variables	Categories	Females	Males	P *
		N=158	N=193	
Competitive sports training experience (years)	≤ 6	20,3	15,5	0,242
	7 - 12	51,9	52,3	0,941
	13 - 19	27,8	30,1	0,637
	20 and more	0,0	2,1	0,068
Sports class	2 <sup>nd</sup>	46,8	51,3	0,402
	1 <sup>st</sup>	34,8	32,6	0,664
	M <sup>a</sup>	13,9	12,4	0,679
	IM <sup>b</sup>	4,4	2,6	0,356
Period of time since the end of sports career (years)	≤ 5	31,6	35,8	0,408
	6 - 10	33,5	25,9	0,121
	11 - 15	15,2	16,1	0,818
	16 - 20	10,8	10,9	0,976
	over 20	8,9	11,4	0,443

Note: \* *p*-value for the two-side two-element structure test, <sup>a</sup> national master, <sup>b</sup> international master

In the multivariate analysis, in the subgroups of female NAs and male NAs, significant correlations were found between SRH and age, education, and occupation. Three times higher risk of negative SRH was observed among the oldest women compared to the youngest ( $p=0.047$ ). Comparison of female NAs with higher education level with those with primary/vocational education revealed that the latter were almost 18 times more inclined to report negative SRH ( $p<0.001$ ). Compared to female students as a reference group, blue-collar workers were over 2 times higher, white-collar workers were almost 5 times, and the non-professionals were almost 11 times more inclined to report their health status as negative ( $p<0.001$ ). In male NAs those aged 51-66 were almost 4-time more likely to assess their health negatively compared to the respondents aged 18-34 years ( $p=0.011$ ). The risk of negative SRH among male NAs with primary/vocational education was over 11 times higher than this value observed among respondents with higher education ( $p<0.001$ ). In relation to occupation, probability of negative SRH reported by the respondents was the lowest among students. Compared to this category of male NAs, blue-collar workers were about 1.5 times more, white-collar workers were 2.3 times more, and the non-professional were 3.5 times more inclined to report negative SRH ( $p=0.36$ ) (Table 3).

**Table 3.** Association between negative self-rated health (vs positive) and socioeconomic (SES) and sport variables: female and male NAs and female and male FAs

SES and sport variables	Categories	Female NA <sup>a</sup>	Male NA <sup>b</sup>	Female FA <sup>c</sup>	Male FA <sup>d</sup>
		OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age (years)	18 – 34	1	1		
	35 - 50	1.73 (1.01-2.99)	1.94 (1.17-3.22)		
	51 – 66	3.01 (1.01-8.94)	3.77 (1.37-10.38)		
		<b>p=0.047</b>	<b>p=0.011</b>		
Education	Primary/vocational	17.94 (4.97-64.71)	11.24 (4.30-29.38)		
	Secondary	4.24 (2.23-8.04)	3.35 (2.07-5.42)		
	Higher	1	1		
		<b>p&lt;0.001</b>	<b>p&lt;0.001</b>		

Occupation	Student	1	1
	Blue-collar worker	2.23 (1.40-3.55)	1.52 (1.03-2.25)
	White-collar worker	4.98 (1.97-12.59)	2.32 (1.06-5.08)
	Non-professional	11.10 (2.76-44.8)	3.52 (1.08-11.46)
		<b>p=0.001</b>	<b>p=0.036</b>
Monthly income per household member	≤ 300 PLN		13.19 (1.88-92.50)
	301 - 600 PLN		5.58 (1.52-20.45)
	601 - 900 PLN		2.36 (1.23-4.52)
	901 PLN and more		1
			<b>p=0.010</b>
Period of time since the end of sports career (years)	≤ 5	1	1
	6 - 10	1.45 (1.00-2.08)	1.44 (1.05-1.98)
	11 - 15	2.09 (1.01-4.34)	2.08 (1.10-3.93)
	16 - 20	3.02 (1.01-9.04)	3.00 (1.16-7.78)
	over 20	4.37 (1.01-18.81)	4.33 (1.22-15.43)
		<b>p=0.048</b>	<b>p=0.024</b>

Note: <sup>a</sup> adjusted for marital status, place of residence, and monthly income per household member, <sup>b</sup> adjusted for marital status, monthly income per household member, and place of residence, <sup>c</sup> adjusted for monthly income per household member, age, occupation, place of residence, education, sports class, competitive sports training experience and marital status, <sup>d</sup> adjusted for occupation, age, marital status, sport class, place of residence, education, and competitive sports training experience

In the subgroups of male and female FAs long period of time since the end of sports career significantly increased the risk of reporting of negative SRH. The respondents who ended this activity over 20 years before the study rated their health as negative over 4 times more frequently than those who have not been involved in competitive sports for ≤ 5 years (respectively: p=0.024 and p=0.48). In male FAs, the risk of negative SRH was also associated with net income/person/month. Compared to men with the highest income, the respondents with the lowest income were over 13 times more likely to report negative SRH (p=0.010) (Table 3).



## Discussion

The aim of the study was to identify SES factors associated with negative SRH in randomly selected male and female FAs and NAs aged 18 to 66 years, and to find whether variables which characterize FAs' past participation in competitive sport modify associations between SRH and SES factors.

In male FAs, perception of health status as negative was affected by low income/person/month. In female FAs none of SES factors included in the study showed significant associations with negative SRH. Results for male and female NAs showed that negative SRH in both subgroups is significantly determined by the same factors: older age, low education level and being non-professional. Our findings for NAs group are consistent with the results of previous studies conducted in Canada [32], Estonia [18], and Poland [33], which have demonstrated that SRH in both men and women was associated with the same variables. Furthermore, the probability of negative SRH related to age and education level were higher in female NAs than in male NAs. In a group of Spanish subjects aged 16+, stronger adverse effect of lower social status on SRH in women compared to men was also found [34].

Similarly to the subgroups of NAs, a significant increase in the risk of the adults' negative SRH with age was observed in men and women in Estonia [18], in Sweden [35], and in adult population of the city of Łódź, Poland [36]. Also in Finnish male elite athletes (mean age: 67.5) the higher risk of negative SRH was shown in older than in younger individuals [22]. In contrast, multivariate analysis conducted in our study did not reveal a significant effect of age on SRH in both male and female FAs. One of the explanations of these differences could be Polish FAs' relatively younger age (18-66 yrs).

In our study education was significantly correlated with SRH in male and female NAs, but it turned out to be an insignificant factor in SRH in male and female FAs. The results obtained for NAs are supported by many previous studies. Poor SRH was typical of less educated men and women in Estonia, Russia and Finland [17] in four Baltic countries: Estonia, Latvia, Lithuania and Finland [37], in other 10 European countries [38], and among inhabitants of the Polish cities: Łódź [36], and Warsaw [39].

Our study demonstrated that low level of income/person/month was conducive to negative SRH in male FAs. After inclusion of the effect of other socioeconomic variables, low income was also associated with fair/poor SRH among adults in 10 European countries [38], and among men and women (age 25-64 years) in Sweden [40]. Other studies have

confirmed that higher income is associated with perfect health [18, 41]. However, comparison of the results obtained in individual countries is difficult because of different measures of income and different categories of these measures adopted in the above studies.

This study have shown that occupation was significantly associated with SRH in male and female NAs. The highest probability of reporting negative SRH was observed among non-professionals. Similarly to this paper, also in the study conducted in randomly selected adults in the city Łódź (Poland) the risk of reporting health as poor or very poor was higher for unemployed men and women comparing to employed [36]. Strong correlations between employment status and SRH were reported by Swedish studies in which, after assessment of the effect of education level, healthy behaviours, environmental conditions and psychosocial factors, low SRH among men and women was significantly favoured by early retirement and being unemployed [35]. Analysis of the relationships between SRH and work among men and women in Russia [16] and Estonia [18] also confirmed that less-than-perfect SRH is significantly correlated with blue-collar jobs. Associations between SRH and work and parental status have been examined in Norway, Sweden, Denmark and Finland. It was found that the unemployed (women and men), regardless of marital and parental status, were more inclined to assess their health as less-than-good than other respondents [42]. In contrast to other studies, we did not find significant associations between SRH and occupation in male and female FAs.

The results of our study confirmed different patterns of socioeconomic relationships between SES and SRH in FAs and NAs. Increase in the risk of negative SRH in NAs was correlated with three unfavourable SES factors, which were similar in the subgroups of men and women. None of SES variables included in the study had a significant association with SRH in female FAs; in the subgroup of male FAs only one association was statistically significant. Therefore one may think that SRH in NAs is strongly affected by their unfavourable SES since SRH in FAs shows poor (men) or no associations (women) with socioeconomic characteristics. The results received in NAs are consistent with other studies that have analysed the underlying importance of socioeconomic factors of SRH among people in post-communist countries [16, 17, 18].

To the best of our knowledge, the relationships between SRH and SES in FAs have been examined in one study only. This study showed that, after multivariate analyses adjustment, the former male elite athletes the good SRH remained significantly associated with younger age, healthy behaviours, and skilled workers status. These accounted for 24% of the variance of good SRH [22].

In this study sport characteristics modified the correlations between SRH and SES in both male and female FAs. Based on the order of reduction of variables from models, one can conclude that sport characteristics showed stronger associations with SRH compared to the most (in men) and all (in women) SES variables. In both male and female FAs, short time from ending participation in sport demonstrated similar patterns of correlations with SRH and reduced the risk of negative SRH.

The main findings of the present study are strong correlations between socioeconomic factors and SRH in NAs and limited correlations between these factors in FAs. Our results considering FAs suggest that former participation in competitive sports was likely to buffer the effect of unfavourable socioeconomic variables on SRH in people aged 18 to 66 years. The obtained results can be explained with the concept of resilience. Its authors argue that the risk factors are compensated for by protective or preventive factors defined as properties of an individual or social environment that reinforce human health potential and reduce susceptibility of a person to risk factors. The protective factors moderate the effect of risk factors in a positive manner: they either compensate the risk or reduce it. The protective factors include: (1) individual resources, e.g. cognitive abilities, abilities of planning, temperament, adaptive abilities, self-control, optimism, self-esteem, self-confidence, motivation processes, social competencies, easiness to make friends, conflict resolution; (2) the resources that result from the relationships with the nearest environment, between a parent and a child, a coach and an athlete, a teacher and a student, peers etc.; (3) local environment resources: good school, friendly and safe neighbourhood, youth and sport clubs, voluntary organizations, religious communities, crisis intervention centres etc. [43].

The limited effect of unfavourable SES factors on SRH among former athletes seems to be caused first and foremost by their individual resources i.e. personality traits that help coping with difficulties of life, which are developed through competitive sports. This hypothesis can be partly supported by the results of previous studies that have described former athletes' personality profile, mood and the psychological functioning of daily living [44, 45]. It is noteworthy that among FAs, those with a history of team and power sport had earlier maintained their psychological ability better than the other group [44], and that those with a history of team sport are less depressed and neurotic and more extroverted and satisfied with their lives than the controls [45]. Bäckmand et al. [22] suggest that it is also possible that a personality profile with lower risk of depression may also have an influence on SRH.

The results of our study suggest that competitive sports might have delayed but beneficial implications which result from buffering the negative effect of low socioeconomic status on SRH among female and male former athletes.

Several factors contribute to the strengths of this paper. To the best of our knowledge, this is the first study to examine both male and female former athletes' SRH in relation to socioeconomic and sport variables. Our cohort was randomly selected among FAs that practiced 26 types of sports in the past. In the present study the subgroup of male and female FAs did not differ significantly with individual socioeconomic and athletic characteristics. Our high response rate provides useful information on FAs and referents age 18-66, and the biases are unlikely to differ between athletes of different status. We considered not only associations between SRH and SES but also the relationships between SRH and three sports variables that have not been analysed by other authors so far. We used one of the most common and strong health indicators, SRH. This measure is among the most frequently assessed health perceptions in epidemiological research. We used a questionnaire to assess SRH. This method has been validated in previous study [46]. Similarly to many authors we dichotomised responses to the self-rated health question, with a cut point between positive (very good + good) and negative (fair + poor + very poor). This allowed for comparison of the results of our study with the results obtained by other authors.

Methodological issues in this study need to be addressed. Firstly, all information on SRH, SES and past participation in competitive sports was self-reported. Secondly, we were not able to collect any information about non-respondents. However, a recent study has found that such worries may be exaggerated, because in general household population random digit-dialed surveys, response rates ranging from 30 to 70%, were not associated with significant bias [47]. Thirdly, although our cohort was much varied in terms of athletic characteristics, it should not be regarded as representative for general population of FAs. Therefore, generalization of the results of this study to all former athletes should be very careful.

## **Conclusions**

In summary, our results show that the male and female former athletes differed from the controls in patterns of associations between SRH and SES. In male and female NAs, the negative SRH is associated with older age, low educational level and being non-professional. In male and female FAs, unfavourable SES is less important for SRH compared to the most of sports variables. Further, it can be speculated that former participation in competitive sports limits the effect of unfavourable socioeconomic characteristics on SRH in men and women

aged 18-66 years. The risk of negative SRH in male and female FAs was reduced by one factor: competitive sports careers which were ended at later stages of life.

Competitive sports are a popular domain of social life. Our findings support the view that promotion of this domain can be one of the effective strategies for public health policies indirectly oriented towards reduction of socioeconomic inequalities in health.

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