Gender Differences in Cardiovascular Diseases Risk for Physical Education Teachers

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A B S T R A C T

The aim of the study was to evaluate the level of habitual physical activity in Croatian physical education (PE) teachers, as well as the existence of some other risk factors for the development of cardiovascular diseases (CVD). The sample consisted of 191 PE teachers aged 24 to 59 years (122 men, mean age 42.6±8.76 and 69 women, mean age 40.3±8.84; p=0.09). In order to assess the level of habitual physical activity, the teachers were asked to fill in Baecke's questionnaire. The questionnaire comprises 16 items testing physical loads at work, during sport activity and during leisure time. The questionnaire also contains 8 items, each of them representing a certain cardiovascular risk factor. In comparison to average adult employed population, PE teachers have a significantly higher level of sport and leisure time activity, which could have a favorable impact on the incidence of particular risk factors, such as overweight/obesity, systolic hypertension and blood cholesterol level. This is more obvious in females PE teachers who pay more attention to the principles of healthy life style: optimal body weight regulation, low fat diet and higher amount of leisure time physical activity (significantly higher than in male teachers). Female PE teachers who have maintained their active life style decrease the risk of CVD, particularly after the age of 55. Although it is necessary to keep in mind all the limitations of a questionnaire study, this preliminary report leads to the conclusion that male PE teachers, although physically active at job, have still kept sedentary habits, often have maintained heavy smoking habits, are slightly overweight, thus minimizing the positive effects of their demanding workplace. Consequently, average male PE teachers' risk for CVD development corresponds to the risk of general male population.

Key words: *physical education teachers, physical activity, CV risk factors*

Introduction

The relationship between the level of physical exercise and health has been well documented in a vast number of studies[1–13]. Low physical fitness is one of the major factors contributing to the increased incidence of cardiovascular disease, diabetes mellitus and skeletal-muscular problems. Numerous studies have pointed out the impact of physical activity upon the risk factors for the development of cardiovascular diseases, such as overweight/obesity, arterial hypertension, hyperlipidemia, glucose intolerance, insulin resistance[1–5].

The habitual physical activity level depends on a whole series of factors, such as age, health status, cultural and biological heritage, socio-economic relations[14].

Physical education (PE) teachers are a relatively homogenous part of employed population regarding their sport activity history during childhood and adolescence, and professional involvement in teaching sport in adult life. It could be presumed that they later in life maintain physically more active life style than the average population, which would have beneficial effects on their cardiovascular risk.

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Sample and Methods

The study was performed during the 12th Annual Summer School of Physical Education Teachers in Rovinj, Croatia. The sample consisted of 191 PE teachers aged 24 to 59 years (122 men, mean age 42.6±8.76 and 69 women, mean age 40.3± 8.84; p=0.09). In order to assess the level of habitual physical activity, the teachers were asked to complete Baecke's questionnaire[15]. The Baecke questionnaire was chosen because of its previous positive confirmation in research[16]. The questionnaire was composed of 16 items testing three habitual activity dimensions: physical load at work, during sport activity and during leisure time. The dimensions were isolated as three meaningful factors within the aspects of habitual physical activity by using principal-components analysis with quartimax rotation[15]. According to the Baecke et al.[15] the test-retest reliability of the indices of physical activity being between 0.80 and 0.90 for work index and sport index, and 0.74 for leisure-time index make the questionnaire useful. Because of investigating a professionally homogeneous sample, for the purpose of this study only two indices were calculated from the results of the applied Baecke's questionnaire: sport activity index (SI) and leisure time index (LI). The cardiovascular risk was assessed by means of the Wilson-Jungner questionnaire for »rough« cardiovascular risk assessment in a population[17]. The questionnaire consisted of 8 items, each of them representing a certain cardiovascular risk factor: heredity, overweight/obesity, smoking habit, cholesterol levels or percentage of animal fat in daily nutrition, physical activity, systolic blood pressure, gender and body constitution. The minimal possible score on CVD risk questionnaire was 6 points, meaning the lowest risk, while the maximal possible score was 62 points, representing an extremely high risk. Range between 18 to 24 points is an average population risk. Only the subjects who answered all questions in both questionnaires were included in data analyses.

The data were processed by descriptive statistics according to gender and age groups. The significance of differences between the sub samples of PE teachers according to gender and sample of av-

erage employed Croatian population was analyzed[14].

Results

The basic descriptive parameters for the two physical activity components for PE teachers: sport activity index (SI) and leisure time activity index (LI) are given in Table 1. The results are sorted by gender and in comparison to average employed population. Male and female teachers do not differ significantly in their age (p=0.09). As for gender, significantly higher average values of sport activity index are observed in male PE teachers (p=0.0030), while female PE teachers show significantly higher average values of their leisure time index (p=0.0008). Both analyzed activity components are significantly higher in PE teachers than in average employed population: sport activity index – 3.66 vs. 2.42 (p<0.00001) for men and 3.37 vs. 2.20 (p<0.00001) for women; leisure time index – 3.05 vs. 2.87 (p=0.0028) for men and 3.39 vs. 2.96 (p< 0.00001) in women.

The prevalence of other analyzed risk factors: cigarette smoking habits, body weight regulation, systolic blood pressure and blood cholesterol/animal fat intake are given in Figures 1 – 4. The results

show that the prevalence of cigarette smoking habit among PE teachers is 21.4% (Figure 1). Although somewhat lower percentage of smokers is found among males (19.8%) than among females (23.5%), the difference is not significant. The distribution of the number of cigarettes per day is gender related. About 4% of males smoke more than 20 cigarettes per day and 1% even more than 40, but none of the female teachers smokes over 20 cigarettes per day.

Optimal body weight (±2.5 kg) reported about 55% of PE teachers (49.2% of males and 67% of females) (Figure 2). Bigger deviation from the perceived individual optimal weight mentioned significantly more men than women (p=0.0011). Ten kilograms overweight admitted 10.8% of male and only 1.5% of female teachers.

The prevalence of systolic hypertension in male and female PE teachers is presented in Figure 3. The prevalence shows significant gender differences (p= 0.00001). Mild systolic hypertension (systolic pressure 140–159 mmHg) was found in 32.3% of male and 9.2% of female teachers, and hypertension of at least 160 mmHg in 6.2% of male (most of them had moderate hypertension), but not among female teachers.

TABLE 1
SPORT ACTIVITY INDEX (SI) AND LEISURE TIME ACTIVITY INDEX (LI) IN MALE AND FEMALE PE TEACHERS COMPARED TO AVERAGE EMPLOYED POPULATION

	PE teachers	Average employed population	p
Males	N=122	N=796	
Age (yrs.)	42.6±8.76	40.3±8.31	0.00613
SI	3.7±0.655[xxx]	2.4±0.638	0.00001
LI	3.1±0.663[xxx]	2.9±0.607	0.00279
Females	N=69	N=635	
Age (yrs.)	40.3±8.84	40.8±7.40	0.55590
SI	3.4±0.603[xxx]	2.2±0.583	0.00001
LI	3.4±0.645[xxx]	3.0±0.589	0.00001

[xxx] p < 0.0001: significant differences between male and female PE teachers

Blood cholesterol level or percentages of animal fat in daily nutrition in teachers are given in Figure 4. The results do not differ between male and female PE teachers. Blood cholesterol levels lower than 5.3 mmol/l were noted in 42.5 % of
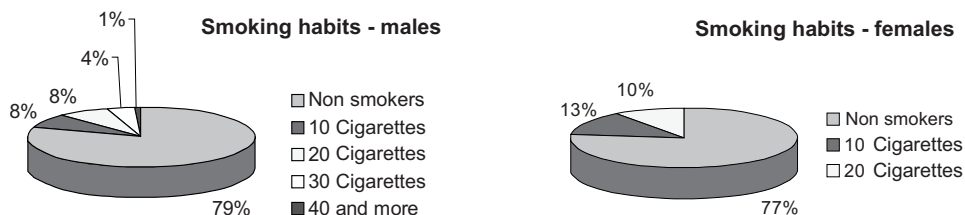
Fig. 1. Cigarette smoking habits in male and female PE teachers.

Fig. 2. Body weight regulation in male and female PE teachers.

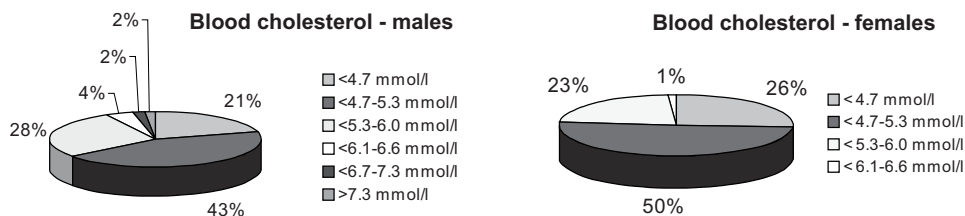Fig. 3. Systolic blood pressure in male and female PE teachers.

Fig. 4. Blood cholesterol levels in male and female PE teachers.

males and 50% of females, and of more than 6.6 mmol/l in 3.5% of males, but not in females.

The overall risk (total score obtained as the sum of the scores in each item according to the Wilson-Jungner questionnaire) was significantly higher in the group of male (19.39±4.46 points) than in the group of female PE teachers (14.18± 2.94 points, p<0.001).

Discussion

In comparison to women PE teachers, their male colleagues were on average significantly more involved in sport, but the difference became significant only after the age of 45. However, female PE teachers were significantly more active in their leisure time. This fact was observed in all the analyzed age groups. Gender difference in the level of sport activity has been expected, being observed in general population as well. However, in general population the significant difference in sport activity is observed earlier, already at the age of 35[14].

In comparison to average employed population[14], PE teachers of both sexes had much higher level of physical activity than general population, they maintained high sport activity level much longer and are much more active in their free time, spending fewer hours in front of TV and in the car.

In regard to other analyzed risk factors for CVD development, significantly lower percentage of smokers was found in PE teachers in comparison to average employed Croatian population (23.5% vs. 34%; p=0.026 in women and 19.8% vs. 43%; p=0.0001) However, the number of smokers among PE teachers was still high and almost 5% of males smoked more than 20 cigarettes per day, contrary to females. The highest number of smokers in both genders was found between the ages of 35 and 45. The number of

smokers decreased after the age of 55 in women, but not so in men.

Optimal body weight (±2.5 kg) was stated by 55% of PE teachers. Ten kilograms overweight admitted 10.8% of male and only 1.5% of female teachers, with an increase in percentage after the age of 55, especially in men. For rough comparison: in average adult Croatian population obese (BMI >30) are 19.6% of men and about 14% of women[14].

The frequency of the most potent risk factor for the development of CVD – arterial hypertension – was found to significantly differ regarding gender. As expected, after the age of 55 higher systolic pressure values were observed, particularly in men. Relatively high prevalence of mild systolic hypertension (systolic pressure 140–159 mmHg) in PE teachers was found. However, the prevalence of systolic blood pressure of at least 160 mm Hg was considerably lower than in general adult population[18,19].

Blood cholesterol level or percentage of animal fat in daily nutrition reported by the examinees did not differ between male and female PE teachers. It is interesting to point out that lower values of blood cholesterol or percentage of animal fat in daily nutrition cited female teachers older than 45, especially after the age of 55. The opposite was found in men.

The overall risk for cardiovascular disease development has been significantly higher in the group of male than in the group of female PE teachers. The mean risk in male PE teachers was higher than expected, corresponding to values of average population risk (range between 18 to 24 points). Although it is necessary to keep in mind all limitations of the simple questionnaire used, this finding could be ascribed to the still high percentage of heavy smokers among PE teachers and their relatively low physical activity during leisure time in comparison to female

PE teachers. On the other hand, the mean risk for female subjects is much lower than the one expected for average population.

Conclusions

In comparison to average adult employed population, PE teachers have significantly higher levels of sport activity and activity in their leisure time, which could positively influence the incidence of particular risk factors, such as overweight/obesity, systolic hypertension and blood cholesterol level. In female PE teachers this is more obvious: together with lower risk of cardiovascular diseases during their reproductive period, females pay more attention to the principles of healthy life style: optimal body weight regulation, low fat diet and higher amount of free time physical activity (significantly higher than in male teachers). Female PE teachers who maintain their active life style decrease the risk of CVD, particularly after the age of 55. Although it is necessary to keep in mind all the limitations of the questionnaire study, this preliminary report leads to the conclusion that male PE teachers, although physically active at job, have still kept sedentary habits and often have maintained heavy smoking habits, are slightly overweight, all of that minimizing the positive effects of their demanding workplace. Consequently, average male PE teachers' risk for CVD development corresponds to the risk of general male population.

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ČIMBENICI OPASNOSTI ZA RAZVOJ BOLESTI SRCA I KRVNIH ŽILA U KINEZIOLOGA

S A Ž E T A K

Cilj istraživanja bio je analizirati čimbenike opasnosti za razvoj bolesti srca i krvnih žila u kineziologa, koji su relativno homogeni dio populacije s obzirom na tjelovježbu tijekom njihove dječje i mladenačke dobi, i koji, profesionalno se opredjeljujući za zvanje kineziologa, zadržavaju aktivniji način življenja. Ispitan je 191 kineziolog dobi 24–59 godina, od toga 69 žena i 122 muškarca. Primjenom dviju anketnih upitnika: Wilson-Jungnerov upitnik za prosudbu kardiovaskularnih i opasnosti u populaciji i Baeckerov upitnik. Ispitano je 8 čimbenika opasnosti: kardiovaskularne bolesti u obitelji, spol, pretilost, navika pušenja cigareta, razina serumskog kolesterola, udio masnoća životinjskog podrijetla u prehrani, sistolički krvni tlak, razina uobičajene dnevne aktivnosti. U odnosu prema prosječnoj zaposlenoj hrvatskoj populaciji, kineziolozi imaju značajno višu razinu aktivnosti tjelovježbe i aktivnosti u svakodnevnom slobodnom vremenu, što pozitivno djeluje na pojedine čimbenike opasnosti poput regulacije tjelesne mase, krvnog tlaka, razine kolesterola u krvi, kao i navike pušenja. U žena kineziologa ti su učinci izraženiji, uz nižu opasnost obolijevanja od kardiovaskularnih bolesti tijekom reproduktivnog perioda, pridavanjem važnosti zdravom načinu življenja, reguliranju tjelesne mase, manjem unosu masnoća životinjskog podrijetla i većoj količini kretanja u slobodnom vremenu, napose u dobi iznad 55 godina. Temeljem dobivenih rezultata moguće je upozoriti na važnost, napose u muškaraca, smanjenja unosa masnoća životinjskog podrijetla u prehrani, prestanka pušenja cigareta, povećanjem kretanja i rada u slobodnom vremenu izvan sportskih aktivnosti.