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Five-Year Cumulative Incidence of Physical Inactivity in Adult Croatian Population: the CroHort Study

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A B S T R A C T

The aim of this study was to analyze gender and age differences in physical inactivity in Croatia and physical inactivity pattern changes during the five-year period. The study is based on the data obtained from the Croatian Adult Health Cohort Study which was carried out in 2003 and 2008. The prevalence of physical inactivity in 2008 was 37.7%, 36.8% in men and 38.1% in women. In both study waves the prevalence was increasing with age in both men and women. The prevalence is statistically significantly higher in subjects older than 64 years than in younger age groups. The incidence of physical inactivity in the five-year period in total was 29.9%, 27.2% in men and 31.1% in women. The increase in prevalence of physical inactivity despite the number of preventive activities carried out periodically emphasizes the need for systematic and comprehensive approach in increasing the number of regularly physically active individuals.

Key words: *physical inactivity, prevalence, incidence, CroHort Study, risk factor*

Introduction

Physical activity is defined by the World Health Organization (WHO) as any bodily movement produced by skeletal muscles that require energy expenditure[1]. Physical activity as one of the basic functional and sarcogenic[2] stimulations of the body is significantly reduced with modern lifestyle. A significant increase in chronic non-communicable diseases and epidemics of increased body weight and obesity provide a clear evidence of imbalance between lifestyle and our biological needs. Physical inactivity has become one of the main risks for population health and one of the main risk factors for the development of chronic non-communicable diseases[2].

Physical inactivity is increasing in many countries and is associated with 3.2 million deaths globally, with 670 000 premature deaths occurring in people younger than 60 years and is accountable for about 30% of cases of diabetes and ischemic heart disease[3]. It has been estimated to cause 6% of cases of death worldwide, which makes physical inactivity the fourth leading risk factor for global mortality[3]. A study carried out in Denmark shows that life expectancy is 8–10 years shorter in physically inactive individuals in comparison with their physically active peers[4].

Furthermore, epidemiological studies have shown that the economic consequences of physical inactivity are a heavy burden for the health budget, with the indirect costs being much higher than the direct ones[5]. These costs are comprised of the economic losses due to illness, disability or reduced work ability and premature death[5]. Provided that the half of the population of 10 million inhabitants is insufficiently physically active, it is estimated that the lack of health benefits from regular physical activity creates a financial cost of approximately 910 million USS annually[6]. It has also been estimated that about 3.1 million days of sick leave can be attributed to the effects of physical inactivity in a population of 5.5 million inhabitants[4].

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For all these reasons, the WHO distinguishes physical activity as extremely important in the prevention of chronic diseases and recommends the engagement in regular moderate intensity physical activity for the duration of at least 150 minutes per week for healthy adults aged 18 to 64[3]. The results of various international reports on the prevalence of physical activity differ significantly, depending on the definition of physical activity used in the study and the nature of the questionnaire used for the assessment. The results from the World Health Survey carried out during 2002–2003 in 51 countries worldwide with short version of the International Physical Activity Questionnaire (IPAQ) used for assessment show the overall prevalence of physical inactivity of 18%, with a vast a range from 2 to 52% in men and 4 to 71% in women[7]. A study carried out in Greece indicates that the incidence of physical inactivity among men and women is 13% and 7%, respectively[8]. Data obtained from the 2003 Croatian Adult Health Survey (CAHS) have shown that a total of 30.5% of Croatian population was considered physical inactive, with gender prevalence in men and women of 28.9% and 31.9%, respectively[9]. According to the data from the Croatian Federation for Sports Recreation, the proportion of physically active population in Croatia is estimated to be 7 to 10%, which contrasts the data from Scandinavian and Central European countries where about 50% of the population is estimated to be physically active[10]. The importance of physical exercise is much better recognized as a key health factor in the above mentioned Scandinavian and Central European countries than in Croatia[10]. These views are confirmed by the German research which found that, recently, the Europeans from Eastern countries and Asians prefer material goods when achieving happiness, while Europeans from Western countries are directed towards intangibles, which mainly involves health, education and maintaining mental and physical fitness[11].

With regard to above mentioned aspects of physical activity and inactivity, the aim of this study was to analyze the changes in the physical inactivity pattern in Croatia, based on the data obtained from the Croatian Adult Health Cohort Study (CroHort) carried out in 2003 and 2008.

Subjects and Methods

This study is part of the Croatian Adult Health Cohort Study (CroHort), a cross-sectional study of the adult population which aims to provide a comprehensive assessment of community health in Croatia[12,13]. The subjects reported on the availability of health care and use of health services, as well as their own health status and determinants of health such as nutrition, physical activity, smoking and alcohol consumption. The survey was initially carried out in 2003 on a representative sample of 9.070 subjects and afterwards repeated in 2008 within the same population, with an overall cohort of 3229 subjects included in both waves of the survey. Because data on physical activity were incomplete for 31 subjects, our study included data on a total of 3198 subjects.

Physical activity in our study was defined using the following variables: physical activity regarding getting to work, the intensity of physical activity at work, the frequency of at least 30 minutes leisure time physical activities and advice from physician or other health care professionals on the need to increase physical activity.

Subjects were considered physically inactive if they have met more than two of the following criteria: a) does not work, works at home or goes to work by car, public transportation, motorcycle or similar means of transportation, b) its work is physically very light (mostly sitting) or light (mostly standing), c) involved in leisure time physical activity 30 minutes per week or less; d) during the past year advised by the physician or other health care professionals to increase their physical activity. Statistical analysis was performed using SPSS (version 14.01; License: Croatian National Institute of Public Health). All Confidence intervals (CI) were calculated with 95% probability levels.

Results

According to criterion for physical inactivity used in our study, 1089 or 33.7% (95% CI=32.1 to 35.4) out of 3228 subjects with known data on physical activity were physically inactive in year 2003. The prevalence of physical among men was 33.3% (95% CI=30.4 to 36.2, N=338) and 33.9% (95% CI=31.9 to 35.9, N=751) among women in year 2003. In year 2008, 1205 or 37.7% (95% CI=36.0 to 39.3) out of 3199 subjects with known data on physical activity were inactive. The prevalence of physical inactivity among men in year 2008 was 36.8% (95% CI=33.8 to 39.8, N=369) and 38.1% (95% CI=36.0 to 40.1, N=836) among women. In both study waves the prevalence was increasing with age in both men and women. The prevalence is statistically significantly higher in subjects older than 64 years than in younger age groups. The difference between prevalence in year 2003 and year 2008 among men was not statistically significant in all age groups (<35, 35–64 and 65+) nor in total. Among women, the overall prevalence of physical inactivity was significantly higher in year 2008 compared to year 2003, while among age groups there was no differences in prevalence. The difference in prevalence between men and women was not significant in year 2003 nor in year 2008 in total and in the age groups of subjects aged less than 35 and 35–64 years old. However, in the age group of subjects older than 64 years of age the prevalence of physical inactivity was significantly higher in women than in men in year 2008 (Table 1).

The overall incidence of physical inactivity in the five-year period was 29.9% (95% CI=27.9 to 31.8). The incidence among men and women was 27.2% (95% CI=23.8 to 30.6) and 31.1% (95% CI=28.8 to 33.5), respectively. There was no difference in five-year incidence between men and women overall and according to age groups. The incidence of physical inactivity was significantly higher

TABLE 1
PHYSICAL INACTIVITY PREVALENCE IN 2003 AND 2008 BY SEX AND AGE GROUPS

Sex and age groups (years)	Prevalence 2003 (%)	CIL95	CIU95	Prevalence 2008 (%)	CIL95	CIU95
Men						
<35	19.4	11.3	27.4	25.9	14.6	37.1
35–64	30.3	26.5	34.1	29.9	25.8	34.1
65+	41.7	36.6	46.8	44.9	40.5	49.4
All age	33.3	30.4	36.2	36.8	33.8	39.8
Women						
<35	23.8	18.8	28.7	28.5	21.3	35.7
35–64	26.6	24.1	29.0	26.8	24.2	29.4
65+	50.1	46.4	53.7	52.7	49.5	55.9
All age	33.9	31.9	35.9	38.1	36.0	40.1

TABLE 2
PHYSICAL INACTIVITY INCIDENCE 2003 – 2008 BY SEX AND AGE GROUPS

Sex and age group (years)	Incidence 2003–2008 (%)	CIL95	CIU95
Men			
<35	17.3	8.8	25.9
35–64	22.5	18.3	26.6
65+	39.6	33.0	46.3
All age	27.2	23.8	30.6
Women			
<35	24.4	18.6	30.2
35–64	25.5	22.7	28.4
65+	48.8	43.6	53.9
All age	31.1	28.8	33.5

in subjects older than 64 years in both sexes when compared to those aged under 35 and aged 35–64 years (Table 2).

3198 subjects were grouped into 4 categories depending on the change in status of physical activity in year 2008 compared to year 2003. Among subjects who were physically active in year 2003 487 (48.6%) men and 1002 (45.6%) women remained active, while 182 (18.2%) men and 453 (20.6%) women became inactive. Among subjects who were physically inactive in year 2003 147 (14.7%) men and 358 (16.3%) women became active, while 186 (18.6%) men and 383 (17.4%) women remained inactive (Table 3). The proportion of subjects who remain active is decreasing in older age groups in both sexes while there is an increase in the proportion of those who remain or become inactive. The proportion of men who become active is increasing with age, while in women the proportion remains unchanged.

TABLE 3
PHYSICAL INACTIVITY PATTERN CHANGES

Sex and age group (years)	Active 2003				Inactive 2003			
	Active 2008		Inactive 2008		Active 2008		Inactive 2008	
	Remained active		Became inactive		Became active		Remained inactive	
	N	(%)	N	(%)	N	(%)	N	(%)
Men								
<35	62	67.4	13	14.1	7	7.6	10	10.9
35–64	300	54.1	87	15.7	78	14.1	90	16.2
65+	125	35.2	82	23.1	62	17.5	86	24.2
All age	487	48.6	182	18.2	147	14.7	186	18.6
Women								
<35	161	57.5	52	18.6	48	17.1	19	6.8
35–64	656	54.8	225	18.8	188	15.7	128	10.7
65+	185	25.7	176	24.5	122	17.0	236	32.8
All age	1002	45.6	453	20.6	358	16.3	383	17.4

Discussion

The analysis of data on physical inactivity obtained from the Croatian Adult Health Cohort Study carried out in 2003 and 2008 shows that certain parameters remain unchanged, while other parameters show worsening in physical inactivity of Croatian population. The prevalence of physical inactivity is increasing with age in both sexes and was statistically significantly higher in patients older than 64 years when compared to younger age groups. Taking into account the fact that the quality of life of elderly people is directly related to the level of daily physical activity and that elderly people who are regularly physically active have fewer health problems than what would be considered common in their age group[14–17], the increase in the prevalence of physical inactivity in our study and especially in the subjects older than 64 years indicates the need for continuous improvement of public health activities which aim to increase the number of regularly active individuals, especially among elderly people. Regular and moderate physical activity in elderly people, assuming that it is programmed and professionally conducted, is resulting in a number of positive effects on the body which primarily comprise of preservation of or increase in the levels of motor and functional abilities and the improvement in the quality of life[18, 19]. Exercise in elderly people undoubtedly brings health benefits[20] and if not performed daily, it should be performed at least 2–3 times per week for at least 15 minutes. Physical activity should be of adequate intensity, in accordance with the gender, physiological age and present degree of health or disease and taking into account the previous experience in sport activities.

Considering the fact that 15–20% of the overall risk of breast cancer and hip fractures due to osteoporosis in elderly women can be attributed to physical inactivity[21], the matter of particular concern are the facts that the overall prevalence of physical inactivity among women was significantly higher in year 2008 compared to year 2003 and that the prevalence of physical inactivity among subjects older than 64 in year 2008 was significantly higher in women than in men (Table 1). When planning physical activities for the female population it should be considered that adequately organized leisure time physical activity positively affects the motivation of the participant and that women who become involved in a recreation program often wish it to be organized more frequently[22].

In subjects older than 64 years the incidence of physical inactivity in both sexes was significantly higher compared to the subjects younger than 35 and those aged 35–64 years (Table 2). The higher figure of subjects who became inactive (182 men and 453 women) compared to the figure of subjects who became active (147 men and 358 women) also shows the trend of increase in physical inactivity.

Our data indicate the absence of a clear trend of increase in the number of physically active individuals. Taking into account the importance of physical activity for the quality of life and overall health, there is a clear need for more systematic public health interventions that would result in an increase in the number of regularly physically active individuals. The emphasis is on systematic activities because periodic activities that were implemented during this five-year period did not bring enough progress. There have been initiatives for a systematic and comprehensive approach in increasing the number of regularly physically active individuals[2]. This study indicates the need for development of a nationally based program for increasing physical activity among Croatian population.

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PETOGODIŠNJA INCIDENCIJA FIZIČKE INAKTIVNOSTI – CroHort STUDIJA

S A Ž E T A K

Cilj ovog istraživanja bio je analizirati spolne i dobne razlike fizičke neaktivnosti u Hrvatskoj i obrazac promjena tijekom petogodišnjeg razdoblja. Studija se zasniva na podacima dobivenim iz Hrvatske kohortne studije kardiovaskularnih rizika provedene 2003 i 2008 godine. Prevalencija fizičke neaktivnosti 2008. godine iznosila je 37,7%, 36,8% kod muškaraca i 38,1% kod žena. U oba vala istraživanja prevalencija se povećavala s dobi i kod muškaraca i kod žena. Prevalencija je statistički značajno veća kod osoba starijih od 64 godine nego u mlađim dobnim skupinama. Incidencija fizičke neaktivnosti u petogodišnjem razdoblju iznosila je ukupno 29,9 %, 27,2% kod muškaraca i 31,1% kod žena. Povećanje prevalencije fizičke neaktivnosti usprkos provođenju brojnih periodičnih preventivnih aktivnosti naglašava potrebu za sustavnim i sveobuhvatnim pristupom kako bi se povećao broj redovito tjelesno aktivnih osoba.