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THE IMPACT OF SOCIO-ECONOMIC PROCESSES ON THE HEALTH OF THE ADULT POPULATION

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SUMMARY

Background: *A cross-sectional study in the Primary Care Medical Centre Mostar and Regional Medical Center "Safet Mujić" was conducted. Family physicians randomly surveyed, examined, and analyzed laboratory tests from 300 subjects divided into three age groups from 20-39, 40-54 and 55-65 years, totally 100 subjects. Data for age, sex, smoking status, alcohol consumption, body mass index, blood pressure, blood glucose, triglycerides and cholesterol, and the presence of chronic non-communicable diseases, including diagnosis of depression and the presence of stress were entered in medical records.*

Results: *Levels of cholesterol were significantly higher in rural population as well as among students, and high triglyceride levels most frequently were presented in the student population. A group of farmers had a significantly higher prevalence of hypertension, DM and CVD compared to other investigated groups. The largest number of smokers and people who drink alcohol was present in group with the highest incomes, while obesity was significantly expressed in people with lower incomes. The group of examinees with the highest incomes had the greatest exposure to stress.*

Conclusions: *Socioeconomic processes have an impact on risk behavior of the adult population, and the presence of a number of chronic diseases that are accompanied with increased laboratory blood glucose, cholesterol and triglycerides levels.*

Key words: *socioeconomic status - risky behavior - biochemical laboratory values - chronic illness - depression and stress*

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INTRODUCTION

Social inequalities in health are often studied phenomenon in public health and epidemiological studies. Their estimate is based on an assessment of socioeconomic status (SES) of an individual or group (Shavers 2007, Jöckel et al. 1998). Low SES is associated with increased morbidity and mortality (Laaksonen et al. 2008, Lantz et al. 1998, Singh et al. 2002, van Oort et al. 2005). Individuals with low SES have low incomes and are faced with weaker professional development opportunities and a higher risk of unemployment (Hart 1971, Lynch et al. 2000). In the population with low SES higher prevalence of unhealthy diet, physical inactivity, smoking and excessive alcohol consumption was observed (Lynch et al. 1997, Lakka et al. 1996, Martikainen et al. 2003).

Previous studies have shown that health behavior, as factor with the greatest influence on health, can explain 12% to 72% of social inequalities in health (Chiuve et al. 2006, Knoops et al. 2004, Sabia et al. 2009, Mokdad et al. 2000, Laaksonen et al. 2003, Skalicka et al. 2009).

Many modern scientific studies have confirmed that belonging to a certain social status has a significant impact on the health of individuals belonging to these groups. The most significant non-infectious diseases in which the occurrence and outcome significantly affect social status, or social environment factors include: diabetes mellitus, malignant disease, injury, addiction, diseases caused by improper diet and cardiovascular disease.

Studies have shown that the social elements of the environment, and socioeconomic status with all its components (employment, education, prospects, housing, working conditions, economic and physical security, life habits, etc..) have a significant impact on health (van der Spuy 2009).

In sociological and epidemiological studies socioeconomic status of an individual is defined by using various indicators, and traditionally level of education, type of work that person does, and income or material status are analyzed (Marmot et al. 2005).

People with lower socioeconomic status have poorer health as measured by the negative health outcomes (more chronic diseases and injuries, poor mental health, higher mortality, etc..) (Marmot et al. 2005, Badura 1991).

The material conditions of life affect health, the quality of personal development (education), family life and mutual interaction and social environment, much more than the possibility of using health care services. There are a number of physical illnesses (chronic illness, infection, injury), developmental and social problems (socialization, job readiness, family life) which lead to difficult material circumstances of life (Graham 2007).

According to Marmot, SES has, in addition to biological factors, the most important significance to the development of the disease and preserving health (Dahlgren et al. 1992, Marmot 2005).

SUBJECTS AND METHODS

The study was conducted in the Primary Care Health Centre Mostar and Regional Medical Center "Safet Mujić". The study included 300 subjects of both sexes randomly. The subjects were divided into three age groups from 20-39, 40-54 and 55-65 years. Each age group consisted of 100 respondents. The sample included 109 men and 191 women. To all respondents who were eligible to participate in the survey, the purpose and objective of the research was explained, and they were asked for informed consent to participate. The study was approved by the Ethics Committee of the University of Mostar School of Medicine.

Diagnostic procedure

A structured questionnaire, which included socio-demographic and clinical history variables such as gender, age, educational level, employment status, occupation, household income, smoking and alcohol were used. In addition, based on the medical records of each subject, the presence of chronic non-communicable diseases, depressive disorders and stress were recorded.

Clinical examination and anthropometric measures

To all study subjects systolic and diastolic blood pressure on the upper arm, with mercury sphygmomanometer was measured. The subjects were rested 30 minutes before measurements. Height and weight were measured hospital scales in light clothing without shoes. All measurements were performed three times in a row, after which the mean value was calculated. Body mass index was calculated by body weight in kilograms divided by height squared in meters (kg/m^2).

Biochemical analysis

Blood samples were taken from the cubital vein in vacuum tubes, in the morning about 8 h after an overnight fasting for a period of 12 hours. The subjects were rested for 30 minutes before measurements. The concentrations of glucose, cholesterol, and triglycerides were determined by enzymatic methods using commercial kits from Olympus diagnostics.

Table 1. The effect of profession on the health of the adult population

	Profession											
	Farming		Industry		Office		Student		Medical		χ^2	p
	N	%	N	%	N	%	N	%	N	%		
Smoking	17	43.6	54	40.3	29	31.9	1	25.0	19	59.4	8.102	0.088
Alcohol	7	17.9	33	24.6	16	17.6	1	25.0	3	9.4	4.548	0.337
ITM											32.501	*<0.001**
20-25	12	30.8	47	35.1	44	48.4	1	25.0	21	65.6		
26-31	26	66.7	63	47.0	45	49.5	3	75.0	10	31.2		
32-37	1	2.6	24	17.9	2	2.2	0	0.0	1	3.1		
Blood pressure											23.803	*<0.001**
100/60-120/70	16	41.0	48	35.8	45	49.5	1	25.0	25	78.1		
130/80-150/90	22	56.4	71	53.0	37	40.7	3	75.0	7	21.9		
160/100-180/110	1	2.6	15	11.2	9	9.9	0	0.0	0	0.0		
GUK											18.079	0.072*
4.0-6.0	22	56.4	81	60.4	67	73.6	4	100.0	26	81.2		
6.1-8.0	15	38.5	47	35.1	18	19.8	0	0.0	6	18.8		
8.1-10	2	5.1	3	2.2	1	1.1	0	0.0	0	0.0		
>10	0	0.0	3	2.2	5	5.5	0	0.0	0	0.0		
Cholesterol											27.273	*<0.001**
3.0-5.0	8	20.5	32	23.9	33	36.3	1	25.0	21	65.6		
5.1-7.0	23	59.0	82	61.2	47	51.6	3	75.0	10	31.2		
7.1-9.0	8	20.5	19	14.2	11	12.1	0	0.0	1	3.1		
>9	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0		
Triglycerides											31.725	*<0.001**
0.5-1.5	17	43.6	36	26.9	31	34.1	0	0.0	23	71.9		
1.6-2.5	14	35.9	62	46.3	51	56.0	3	75.0	8	25.0		
2.6-3.5	6	15.4	27	20.1	9	9.9	1	25.0	1	3.1		
>3.5	2	5.1	9	6.7	0	0.0	0	0.0	0	0.0		

* Fisher's exact test

Table 2. The effect of profession on the health of the adult population

	Profession											
	Farming		Industry		Office		Student		Medical		χ^2	p
	N	%	N	%	N	%	N	%	N	%		
HTA	27	69.2	86	64.2	43	47.3	0	0.0	6	18.8	31.602	*<0.001*
DM	15	38.5	32	23.9	15	16.5	0	0.0	3	9.4	12.264	*0.015*
KVB	10	25.6	22	16.4	18	19.8	0	0.0	0	0.0	10.103	*0.035*
Malignances	3	7.7	5	3.7	5	5.5	0	0.0	0	0.0	3.024	0.494*
Depression	7	17.9	16	11.9	10	11.0	0	0.0	2	6.2	2.366	0.642*
Stress	21	53.8	70	52.2	47	51.6	2	50.0	24	75.0	6.038	0.196

* Fisher's exact test

Table 3. The effect of employment on the health of the adult population

	Employment									
	Constantly employed		Occasionally employed		Not employed		Pensioner		χ^2	p
	N	%	N	%	N	%	N	%		
Smoking	62	43.1	12	44.4	33	37.5	13	31.7	2.186	0.535
Alcohol	30	20.8	7	25.9	17	19.3	6	14.6	1.418	0.701
ITM									10.987	0.089
20-25	64	44.4	10	37.0	36	40.9	15	36.6		
26-31	71	49.3	13	48.1	38	43.2	25	61.0		
32-37	9	6.2	4	14.8	14	15.9	1	2.4		
Blood pressure									18.649	*0.005*
100/60-120/70	74	51.4	12	44.4	38	43.2	11	26.8		
130/80-150/90	53	36.8	12	44.4	46	52.3	29	70.7		
160/100-180/110	17	11.8	3	11.1	4	4.5	1	2.4		
GUK									10.070	0.259*
4.0-6.0	98	68.1	16	59.3	61	69.3	25	61.0		
6.1-8.0	39	27.1	10	37.0	21	23.9	16	39.0		
8.1-10	1	0.7	1	3.7	4	4.5	0	0.0		
>10	6	4.2	0	0.0	2	2.3	0	0.0		
Cholesterol									9.387	0.416*
3.0-5.0	51	35.4	8	29.6	23	26.1	13	31.7		
5.1-7.0	74	51.4	14	51.9	52	59.1	25	61.0		
7.1-9.0	19	13.2	4	14.8	13	14.8	3	7.3		
>9	0	0.0	1	3.7	0	0.0	0	0.0		
Triglycerides									10.585	0.305
0.5-1.5	63	43.8	6	22.2	26	29.5	12	29.3		
1.6-2.5	60	41.7	13	48.1	43	48.9	22	53.7		
2.6-3.5	17	11.8	6	22.2	15	17.0	6	14.6		
>3.5	4	2.8	2	7.4	4	4.5	1	2.4		

* Fisher's exact test

Table 4. The effect of employment on the health of the adult population

	Employment									
	Constantly employed		Occasionally employed		Not employed		Pensioner		χ^2	p
	N	%	N	%	N	%	N	%		
HTA	59	41.0	17	63.0	50	56.8	36	87.8	29.856	*<0.001*
DM	26	18.1	4	14.8	24	27.3	11	26.8	4.127	0.248
KVB	21	14.6	3	11.1	15	17.0	11	26.8	4.108	0.250
Malignancies	8	5.6	0	0.0	5	5.7	0	0.0	3.071	0.351*
Depression	10	6.9	5	18.5	13	14.8	7	17.1	6.333	0.097
Stress	87	60.4	18	66.7	44	50.0	15	36.6	9.672	*0.022*

* Fisher's exact test

Statistical analysis

The data were stored in Microsoft Excel 2003 database. Data entry was performed during the study, and backup was made on the daily basis. The results were analyzed using descriptive statistical methods. Categorical variables were presented as descriptive statistical frequency and percentage differences in the nominal variables were tested by chi-square test and Fisher exact test where it was needed. Significance level of $P<0.05$ was chosen for the assessment of the significance of the results. SPSS statistical software, version 11, was used for all statistical analyzes (SSPS Inc., Chicago, IL).

RESULTS

We analyzed groups according to occupation. The student population had a higher percentage of the threshold pressure and obesity compared to other groups. Cholesterol levels were significantly higher in rural population as well as among students. Triglyceride levels most frequently were present in the student population (Table 1).

A group of farmers had a significantly higher prevalence of hypertension, DM and CVD compared to other treatment groups (Table 2).

Table 5. The effect of income on the health of the adult population

	Income of household											
	<300		300-500		600-800		900-1000		>1000		χ^2	p
	N	%	N	%	N	%	N	%	N	%		
Smoking	13	23.2	55	42.6	25	44.6	22	59.5	5	22.7	16.023	*0.003*
Alcohol	2	3.6	29	22.5	9	16.1	15	40.5	5	22.7	20.342	*<0.001*
ITM											19.766	*0.011*
20-25	23	41.1	42	32.6	31	55.4	17	45.9	12	54.5		
26-31	25	44.6	69	53.5	23	41.1	20	54.1	10	45.5		
32-37	8	14.3	18	14.0	2	3.6	0	0.0	0	0.0		
Blood pressure											17.512	*<0.025*[*]
100/60-120/70	23	41.1	49	38.0	27	48.2	21	56.8	15	68.2		
130/80-150/90	32	57.1	63	48.8	24	42.9	15	40.5	6	27.3		
160/100-180/110	1	1.8	17	13.2	5	8.9	1	2.7	1	4.5		
GUK											7.712	0.771[*]
4.0-6.0	39	69.6	83	64.3	40	71.4	21	56.8	17	77.3		
6.1-8.0	13	23.2	38	29.5	16	28.6	14	37.8	5	22.7		
8.1-10	2	3.6	3	2.3	0	0.0	1	2.7	0	0.0		
>10	2	3.6	5	3.9	0	0.0	1	2.7	0	0.0		
Cholesterol											19.125	0.086[*]
3.0-5.0	21	37.5	29	22.5	20	35.7	14	37.8	11	50.0		
5.1-7.0	25	44.6	85	65.9	30	53.6	15	40.5	10	45.5		
7.1-9.0	10	17.9	14	10.9	6	10.7	8	21.6	1	4.5		
>9	0	0.0	1	0.8	0	0.0	0	0.0	0	0.0		
Triglycerides											17.576	0.129[*]
0.5-1.5	13	23.2	47	36.4	25	44.6	12	32.4	10	45.5		
1.6-2.5	29	51.8	54	41.9	28	50.0	17	45.9	10	45.5		
2.6-3.5	12	21.4	24	18.6	2	3.6	5	13.5	1	4.5		
>3.5	2	3.6	4	3.1	1	1.8	3	8.1	1	4.5		

[*] Fisher's exact test

Table 6. The effect of income on the health of the adult population

	Income of household											
	<300		300-500		600-800		900-1000		>1000		χ^2	p
	N	%	N	%	N	%	N	%	N	%		
HTA	32	57.1	81	62.8	22	39.3	18	48.6	9	40.9	11.061	*0.026*
DM	13	23.2	35	27.1	7	12.5	7	18.9	3	13.6	6.122	0.190
KVB	9	16.1	26	20.2	5	8.9	7	18.9	3	13.6	3.839	0.428
Malignancies	3	5.4	10	7.8	0	0.0	0	0.0	0	0.0	7.407	0.068[*]
Depression	9	16.1	16	12.4	4	7.1	6	16.2	0	0.0	5.883	0.208
Stress	19	33.9	70	54.3	34	60.7	28	75.7	13	59.1	17.017	*0.002*

[*]Fisher's exact test

When we analyzed the differences in the employment, the pensioners had the higher percentage of higher blood pressure compared to the other groups (Table 3). According to the employment, the group of pensioners had the highest percentage of hypertension, while the highest level of stress was present in permanent employees (Table 4).

When we analyzed the differences in revenue smoking and alcohol use were most present in the group with income from 900-1000 KM, obesity was most frequent in the group with the lowest income and the limit values of blood pressure (Table 5). Most HTA were in the group with 300-500 KM revenue, while the stress was highest in the group with 900-1000 KM of income (Table 6).

In examining the differences in education we showed that respondents with higher education usually drink alcohol, obesity was most frequent in the group of primary school students and among respondents with higher education. The participants with high school usually had adequate blood pressure; elevated levels of glucose in the highest percentages as well as cholesterol levels were present in a group of elementary school students (Table 7, Table 8).

HTA and DM were the most presented in the group of elementary school students.

Table 7. The effect of education on the health of the adult population

	Education									
	Primary school		Secondary school		College		High school		χ^2	p
	N	%	N	%	N	%	N	%		
Smoking	8	29.6	79	45.4	3	27.3	30	34.1	5.349	0.148
Alcohol	0	0.0	40	23.0	4	36.4	16	18.2	9.744	*0.021*
ITM									20.450	*0.002*
20-25	7	25.9	64	36.8	4	36.4	50	56.8		
26-31	18	66.7	86	49.4	7	63.6	36	40.9		
32-37	2	7.4	24	13.8	0	0.0	2	2.3		
Blood pressure									21.235	*0.002*
100/60-120/70	9	33.3	65	37.4	4	36.4	57	64.8		
130/80-150/90	15	55.6	95	54.6	6	54.5	24	27.3		
160/100-180/110	3	11.1	14	8.0	1	9.1	7	8.0		
GUK									15.788	*0.041*[*]
4.0-6.0	12	44.4	119	68.4	7	63.6	62	70.5		
6.1-8.0	14	51.9	49	28.2	3	27.3	20	22.7		
8.1-10	1	3.7	4	2.3	0	0.0	1	1.1		
>10	0	0.0	2	1.1	1	9.1	5	5.7		
Cholesterol									23.759	*0.002*[*]
3.0-5.0	4	14.8	44	25.3	4	36.4	43	48.9		
5.1-7.0	17	63.0	104	59.8	5	45.5	39	44.3		
7.1-9.0	6	22.2	25	14.4	2	18.2	6	6.8		
>9	0	0.0	1	0.6	0	0.0	0	0.0		
Triglycerides									12.829	0.131[*]
0.5-1.5	8	29.6	56	32.2	4	36.4	39	44.3		
1.6-2.5	12	44.4	82	47.1	3	27.3	41	46.6		
2.6-3.5	6	22.2	29	16.7	3	27.3	6	6.8		
>3.5	1	3.7	7	4.0	1	9.1	2	2.3		

[*]Fisher's exact test

Table 8. The effect of education on the health of the adult population

	Education									
	Primary school		Secondary school		College		High school		χ^2	p
	N	%	N	%	N	%	N	%		
HTA	21	77.8	108	62.1	6	54.5	27	30.7	29.970	*<0.001*
DM	13	48.1	37	21.3	2	18.2	13	14.8	13.716	*0.003*
KVB	6	22.2	32	18.4	3	27.3	9	10.2	4.491	0.213
Malignancies	1	3.7	8	4.6	1	9.1	3	3.4	1.468	0.645[*]
Depression	6	22.2	22	12.6	1	9.1	6	6.8	5.158	0.161
Stress	9	33.3	96	55.2	5	45.5	54	61.4	6.946	0.074

[*]Fisher's exact test

DISCUSSION

Socioeconomic inequality in the human population is reflected in the health of people, primarily due to differences in exposure to risks of illness, injuries to and deaths of various social groups of the human population, but also because of the different possibilities in the prevention, timely diagnosis and quality treatment. Risky health behaviors are associated with SES and differently represented among different social groups. In our study, obesity was most frequent in the group with the lowest income.

The largest proportion of participant with unhealthy diet was among low SES and in line with expectations and previous research (Martikainen et al. 2003, Musić Milanović 2010, Galobardes et al. 2001, Groth et al. 2001). The diet of poor social groups is characterized by frequent adding fat in diet (Groth et al. 2001, van Rossum et al. 2000, Linseisen et al. 2002), although only in a few research highlights the differences between fats of animal and vegetable origin. Meta-analysis showed that adults on low SES, with interest as an indicator of social status, the greater consumption of saturated fats than in patients with high SES, other than respondents in Spain and Estonia (Irala-Estevez et al. 2000).

We have shown that cholesterol levels were significantly higher in speaking rural population as well as among students, and elevated triglyceride levels were present in the student population.

Tests showed the differences in health status of the population of lower and higher social or social classes. Studies conducted in the Republic of Croatia indicate a link between social factors with adverse health outcomes. Unemployment has proven as predictor for developing of diabetes (Poljičanin et al. 2012), whereas the incidence of hypertension was significantly higher in low-educated women (Erceg et al. 2012). However, education is also in the female population, proved to be a significant predictor of obesity in the period from 2003 to 2008 (Musić Milanović et al. 2012).

In our study, a group of farmers had a significantly higher prevalence of hypertension, DM and CVD compared to other treatment groups. In Bosnia and Herzegovina shall be made fully reliable, more systematic examination of the relationship or correlation between the economic, social, professional, cultural and other status to the health status of the population. A small number of implemented public health and other tests and empirical findings confirm that there is an association or affiliation between interdependence and social groups and health status of the population in Bosnia and Herzegovina. However, more systematic examination of the relationship or correlation between the economic, social, professional, cultural and other status to the health status of the population is necessary. A small number of implemented public health and other tests and empirical findings confirm that there is an association or affiliation between interdependence and social groups and health status of the population in the previous period, the population of Bosnia and Herzegovina was exposed to risk factors that could significantly affect the health of the population. Such studies were conducted in 2003 in the Federation of Bosnia and Herzegovina. Constant exposure to stress, social inequality (unhealthy way of living, as well as events from the 90s are significantly influenced the morbidity and mortality from cardiovascular disease (Vasilj et al. 2009, Ivanković et al. 2010, Babić et al. 2013, Vasilj et al. 2006, Bergovec 2005).

Despite growing evidence of the association of socioeconomic status with health, the impact of all the indicators of socioeconomic status is still not fully understood. One of the main issues is that the dimensions of socioeconomic status, the greatest impact on health - on the one hand the material and economic aspects (income and personal wealth), and other non-material dimensions (education and social support) (Marmot 2005). The impact of socioeconomic status on health and the environment has not yet been sufficiently explored. Previous studies have not provided an explanation of the interrelatedness of socioeconomic status and environment of the individual and examine the mechanism of their effects on health and personal perception of mental and physical health. In a large study conducted in 22 European countries, the mortality rate is significantly higher in countries with lower socioeconomic status (Mackenbach et al. 2008). Especially significant differences were observed in Eastern European countries and the Baltic region, while in the southern region of these differences significantly less. These results of research have pointed to large differences in the impact of socioeconomic status on mortality among European countries and emphasized the importance of research into the specifics of individual countries (Mackenbach et al. 2008).

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