Traditional CVD Risk Factors and Socio-Economic Deprivation in Roma Minority Population of Croatia

Hrvojka Zeljko[1], Tatjana Škarić-Jurić[2], Nina Smolej Narančić[2], Marijana Peričić Salihović[2], Irena Martinović Klarić[2], Maja Barbalić[2], Boris Starčević[3], Lovorka Barać Lauc[2] and Branka Janićijević[2]

[1] General Hospital »Sveti Duh«, Zagreb, Croatia
[2] Institute for Anthropological Research, Zagreb, Croatia
[3] General Hospital »Dubrava«

ABSTRACT

Researches into health inequalities consistently show disadvantages in health status, morbidity and mortality for various ethnic minority groups. Current knowledge about prevention of cardiovascular diseases (CVD) mainly derives from studies carried out in populations of European origin while the evidences involving Roma population are scarce. Roma, an ethnic minority of northern Indian origin, live in many countries throughout the world and are well known for preserved traditions and resistance to assimilation. They are most often marginalized economically, spatially, politically and in terms of culture. In order to assess the health status and health-related lifestyle attributes, a multidisciplinary anthropological and epidemiological community-based study was carried out including a total of 423 members of the Bayash Roma minority population living in two regions of Croatia (144 men and 279 women, aged 18–84 yrs). Hypertension (HT) was found in 24.8% Bayash Roma (21.5% men and 26.5% women) using standard diagnostic criteria (i.e. BP ≥ 140/90 mm Hg or taking antihypertensive therapy). The prevalence increases from 5.9% in the age group 18–34 yrs; 35.0% in the age group 35–64 yrs, and 51.4% in the age group 65+ yrs. The prevalence of hypertension in the Bayash Roma is almost half of the magnitude of what is usually reported for the general population of Croatia. It is also lower when compared with other European populations and this finding is not due to comparatively younger average age of the Bayash sample. The significant association of hypertension with age and BMI was confirmed in this study and the importance of non-traditional SES-related CVD risk factors was highlighted. Smoking is a part of traditional Roma life-style and with 70% of smokers almost the entire population is equally exposed to this risk factor in their family environment. Since homogenously distributed, this risk factor did not show to be a significant predictor of hypertension. The extent to which hypertension is influenced by traditional CVD risk factors as well as by some SES indicators was also assessed using a forward stepwise method of the multivariate logistic analysis. Each risk factor was explored as quantitative variable as well as qualitative one using various cut-offs. The best model showed to be the one having age and BMI presented as quantitative variables and sex, region, smoking status, income and schooling years as categorical ones; with cut-off 3 for number of income sources and 8 for the number of schooling years. In spite of the low prevalence of hypertension, the presented results are showing that Bayash Roma are bearing a high CVD risk factors load. We expect that with westernization of their life-style and along with increase of the economic power, the proportion of CVD in population of Bayash Roma will also increase. Therefore, it is important to recognize the need for early cardiovascular disease risk factors prevention in this minority population.

Key words: hypertension, prevalence, CVD, risk factors, SES, poverty, Roma, Croatia

Introduction

It is well known that cardiovascular diseases (CVD) are estimated to be the leading cause of death and disability-adjusted life years[1]. A number of epidemiological studies have demonstrated that lifestyle greatly influences the cardiovascular risk pattern of populations and that modernization is associated with increased incidence of non-communicable diseases, such as hypertension, obesity, dyslipidemia and diabetes mellitus.

Along with still growing evidence coming from epidemiological studies carried out world-wide that continually confirm the importance of classical CVD risk factors, the knowledge of the relationship between CVD risk and poverty expands only recently.

Socioeconomic status (SES) is consistently among the most fundamental determinants of health[2,3]. Influence of SES on cardiovascular disease could be viewed as the combined effects of social disparities in health-related behaviors, environmental conditions and the contact and delivery of health care[3,4].

Research into health inequalities has shown consistent disadvantages in health status, morbidity and mortality for various ethnic minority groups[5,6]. Current knowldge about prevention of coronary heart disease and other cardiovascular diseases mainly derives from studies carried out in populations of European origin[7] while the evidence involving Roma population is scarce[6,8–12].

Roma, an ethnic minority of northern Indian origin, live in many countries throughout the world and are well known for preserved traditions and resistance to assimilation. They are most often marginalized economically, spatially, politically and in terms of culture. Croatia has a substantial Roma population, the exact size estimated to be over 30 000 (about 1% of the total population of Croatia)[13]. The Bayash are one of many Romani branches who, between 14th and 19th centuries lived in historical Romanian states Wallachia and Moldavia, where they were kept as slaves. After 1856, when the slavery in Romania was finally abolished, larger Bayash groups immigrated to Croatia[14].

From the genetic-epidemiological perspective, Roma population might be considered as a particularly vulnerable group for developing common chronic diseases. Namely, with the increase in life expectancy, the prevalence of chronic diseases in Roma population may rise even at a higher rate than in other populations since bearing additional both genetic and environmental risks. Those risks are connected with the following characteristics of Roma populations:

a) Low socio-economic status and cultural specificities that shape lifestyle patterns compromising health-related behaviors;

b) High degree of reproductive isolation that enhances the possibility of increased frequencies of homozygous genotypes as the consequences of drift and inbreeding[10].

In order to assess the health status and health-related lifestyle attributes of the Roma minority population living in Croatia, a multidisciplinary anthropological and epidemiological community-based study was carried out in 2005/06 in Bayash settlements in Baranja and Međimurje.

Goals of the present study

- To report the preliminary results on blood pressure levels and prevalence of hypertension in Bayash Roma minority population of Croatia and to compare it to surrounding populations;
- To assess the importance of some traditional CVD risk factors (BMI, smoking) in this population;
- To investigate the possibility of the association of blood pressure values with some indicators of socio-economic status (SES indicators of poverty) in this population.

Participants and Methods

The dataset used in this study is a subset of the extensive material collected in field studies carried out in 2005 to 2006 in Bayash settlements in Baranja and Međimurje regions of Croatia (Figure 1). The study was held in cooperation with the Office for National Minorities of the Government of the Republic of Croatia and the Croatian National Institute of Public Health.

All examinees voluntarily participated in the study and before signing the informed consent were informed about the goals, methods and expectations of the project. The study protocol included measurement of various health-related biometric traits and an extensive interview (more thorough information can be found in the previous report[6]).

A total of 423 members of the Bayash population living in Baranja and Međimurje (144 men and 279 women, aged 18–84 yrs) were included in the study. Whereas the gender structure of two regional samples is similar, the age structure differ significantly reflecting voluntary participation. The comparability of two Bayash sub-populations was achieved by presenting additionally the preva-

Fig. 1. Map of Croatia.

lence of hypertension within separate age groups: 18–34, 35–64, and 65+ years' olds.

Blood pressure measurements were performed in the sitting position through the use of a mercury sphygmomanometer by an experienced and certified examiner. The second measurement was taken as valid due to the fact that participants had been sitting for 10–15 minutes before the second measurement.

The hypertensive group (»cases«) incorporates participants who declared themselves as hypertensives (indicating previously diagnosed hypertension by personal physician) and those in whom the measured systolic blood pressure values were equal or higher than 140 mmHg or diastolic blood pressure measures were equal or higher than 90 mmHg.

Short anthropometry was undertaken following standard IBP Protocol[15]. Body mass index (BMI) was calculated as weight (kg) / stature (m)^2. BMI equal or higher than 25 was used as an obesity criterion.

Smoking status was assessed qualitatively – as the proportion of smokers – and quantitatively using estimate »pack per year«. »Pack per year« was calculated as the number of cigarettes smoked daily multiplied by years of smoking and divided by 20.

The socio-economic status was represented by two variables – the total number of income sources (ranging in the sample from zero to three) and years of education (ranging in the sample from zero to twelve). Due to the staggering unemployment rate – e.g., only 7 persons reported to have permanent jobs – the economic status was roughly estimated using the total number of financial resources. Namely, the main financial inputs in Bayash population are social welfare support allowance (83.6%)

and child allowance (47.0%), while a smaller proportion of the population depends on retirement allowance and salaries coming from occasional or permanent jobs[6].

The education level was presented as a quantitative variable »years of schooling« and two qualitative ones: the proportion of persons who ever attended school and the proportion of persons who finished elementary education (8 and more years of schooling). According to the recently published data[6], the proportion of Bayash who never attended school amounts to 33.3% and the average schooling years for those 66.7% who were enrolled in education system amounts to 5.3 years. The overall average participation of the Bayash in formal education system is 3.6 years and only 10% completed 8-year elementary education, 4.4% were enrolled in secondary education whereas none of the examinees reported university level education.

Statistical analyses

Descriptive statistics was shown in absolute numbers and frequencies for the qualitative variables, and means and standard deviations for the quantitative ones. Differences in qualitative variables (sex, region, hypertensive status) were tested using Fisher's exact test and differences in quantitative variables by t-test. The blood pressure values were age-adjusted by means of multiple regression analysis and standardized residuals were used in relating blood pressure values with the number of income sources. The association of hypertension with CVD risk factors was assessed by logistic regression analysis. All analyses were performed by SPSS 10.0 statistical package for Windows (SPSS Inc., Chicago, IL, USA), with statistical significance set at p ≤ 0.05.

TABLE 1
DESCRIPTIVE STATISTICS FOR CHARACTERISTICS RELATED TO HYPERTENSION (AGE STRUCTURE, BLOOD PRESSURE, BODY MASS INDEX, SMOKING STATUS, EDUCATION AND INCOME) IN BAYASH POPULATION OF CROATIA. SEX DIFFERENCES WERE TESTED USING T-TEST FOR QUANTITATIVE AND FISHER'S EXACT TEST FOR QUALITATIVE VARIABLES.

	Total (N=423)	Men (N=144)	Women (N=279)	p (M vs. F)
Age (mean, SD)	41.1 (15.2)	38.9 (15.1)	42.3 (15.1)	0.029
18–34 yrs (n, %)	169 (40.0)	64 (44.4)	105 (37.6)	
35–64 yrs (n, %)	217 (51.3)	69 (47.9)	148 (53.0)	
65+ yrs (n, %)	37 (8.7)	11 (7.6)	26 (9.3)	
Systolic BP (mean, SD)	120.2 (25.8)	119.3 (18.5)	120.7 (28.9)	0.598
Diastolic BP (mean, SD)	75.8 (13.5)	76.9 (11.4)	75.2 (14.5)	0.221
Hypertension (n, %)	105 (24.8)	31 (21.5)	74 (26.5)	0.260
BMI (mean, SD)	25.5 (5.7)	25.3 (5.0)	25.6 (6.0)	0.595
BMI >25 (n, %)	202 (48.6)	71 (50.0)	131 (47.8)	0.672
Smokers (n, %)	297 (70.4)	104 (72.2)	193 (69.4)	0.551
Pack/year (mean, SD)	21.6 (18.0)	24.9 (21.9)	19.8 (15.3)	0.013
Schooling years: 0–12 y (mean, SD)	3.5 (3.3)	4.4 (3.4)	3.1 (3.2)	0.000
Ever attended school (n, %)	267 (66.4)	111 (80.4)	156 (59.1)	0.000
Schooling years: 8+ (n, %)	64 (15.9)	25 (18.1)	39 (14.8)	0.384
Income sources (mean, SD)	1.6 (0.8)	1.8 (0.9)	1.5 (0.7)	0.001
Income sources: <3 (n, %)	347 (86.5)	103 (75.2)	244 (92.4)	0.000

Results

Descriptive statistics for age, systolic and diastolic blood pressure, body mass index, smoking status, schooling years and the number of income sources of the Bayash sample is presented in Table 1.

Significant differences among two sexes are found for age, intensity of smoking, schooling years and the number of income sources. In this sample females were older than males (42.3 yrs. vs. 38.9 yrs.). While the proportion of smokers in two sexes is similar, males are heavier smokers compared to females (24.9 vs. 19.8 pack/year). A higher proportion of men attend school and their schooling lasts on the average 1.3 years longer than that of women. Men also have significantly more income resources than women.

The prevalence of hypertension in Bayash sample is 24.8% (M: 21.5%, F: 26.5%). As presented in Table 2,

TABLE 2
PREVALENCE OF HYPERTENSION IN BAYASH ROMA BY SEX, AGE AND REGION (TESTED BY CHI²-TEST)

Age group	Total sample (%)	Men (%)	Women (%)	p Men vs. Women	Baranja (%)	Međimurje (%)	p Baranja vs. Međimurje
18–34	5.9	9.4	3.8	0.137	4.2	7.1	0.428
35–64	35.0	30.4	37.2	0.333	39.0	25.4	0.057
65+	51.4	36.4	57.7	0.235	51.4	50.0	0.969
TOTAL	24.8	21.5	26.5	0.260	31.2	14.7	0.000

TABLE 3
RELATION BETWEEN PREVIOUSLY DIAGNOSED HYPERTENSION (dHT) AND ELEVATED BLOOD PRESSURE VALUES (»MEASURED HYPERTENSION«; mHT) IN BARANJA AND MEĐIMURJE POPULATIONS

Hypertension status		Baranja		Međimurje	
	Definition	N	%	N	%
Non-hypertensive	No dHT and no mHT	179	68.9	139	85.3
Undiagnosed hypertension	No dHT but mHT	51	19.6	21	12.9
Successfully treated hypertension	dHT but no mHT	7	2.7	1	0.6
Unsuccessfully treated hypertension	dHT and mHT	23	8.9	2	1.2
TOTAL		260	100	163	100

TABLE 4
PREVALENCE OF POTENTIAL RISK FACTORS FOR HYPERTENSION IN HYPERTENSIVE (HT) AND NON-HYPERTENSIVE GROUP (non-HT) OF BAYASH ROMA BY SEX AND AGE (TESTED BY CHI²-TEST)

		Men			Women		
		HT (%)	non-HT (%)	p HT vs. non-HT	HT (%)	non-HT (%)	p HT vs. non-HT
Smokers							
	35–64	66.7	72.9	0.599	69.1	76.1	0.353
	TOTAL	64.5	74.3	0.280	64.9	71.1	0.320
Overweight persons							
	35–64	85.7	54.4	0.013	77.4	47.3	0.000
	TOTAL	74.2	43.2	0.002	77.5	37.4	0.000
Income – less than 3 sources							
	35–64	95.2	70.2	0.021	98.0	87.5	0.033
	TOTAL	90.3	70.8	0.027	98.6	90.3	0.025
Schooling years – less than 8							
	35–64	95.2	85.1	0.231	94.0	86.2	0.160
	TOTAL	96.8	77.6	0.015	95.6	81.6	0.005
Schooling years – never attended school							
	35–64	28.6	21.3	0.512	54.0	49.4	0.606
	TOTAL	32.3	15.9	0.043	59.4	34.4	0.000

according to the age group the prevalence increases from 5.9% in the age group 18–34 yrs, 35.0% in the age group 35–64 yrs to 51.4% in the age group 65+ yrs. In neither age group the difference between males and females was found to be significant.

Hypertension was more prevalent in the Bayash from Baranja (31.2%) than those from Međimurje (14.7%). But the comparison of hypertension prevalence within age groups indicated that the observed regional difference could be attributed to the age differences between two samples.

The relation between measured hypertension (mHT) and previously diagnosed hypertension (dHT) in Bayash population is given in Table 3. In both sub-samples the majority of persons belong to non-hypertensive group (68.9% in Baranja and 85.4% in Međimurje). The »undiagnosed hypertension« is present in 19.6% of the Bayash in Baranja and 12.9% in Međimurje. The »unsuccessfully treated hypertension« is present in 8.9% Bayash in Baranja and 1.2% in Međimurje, while the lowest percentages refer to »successfully treated hypertension» (2.7% in Baranja and 0.6% in Međimurje).

Fig. 2. Systolic and diastolic blood pressure in relation to number of income sources in Bayash Roma (sex and age adjusted blood pressure data).

The association of hypertension with CVD risk factors is presented by comparing the prevalence of the investigated CVD risk factors between hypertensives (cases) and normotensives (controls) (Table 4). The prevalence of each CVD risk factor – i.e. smoking, overweight, less than 3 sources of income, less than 8 years of education and never attending school – in cases and controls is presented for men and women separately. The possible influence of age was attenuated by considering the narrower age group (35–64 yrs) across all the samples.

Among five examined indicators, the prevalence of smoking was the only one that did not differ between hypertensive and normotensive persons. And this is equally true at the level of the total sample as it is for each investigated sex and age group.

The association of hypertension with BMI and with income sources showed to be significant for both sexes in the age 35–64 yrs as well as in the total sample. The proportion of persons having BMI ≥ 25 is higher in cases (M: 85.7%, F: 77.4%) than in controls (M: 54.4%; F: 47.3%). The difference in proportion of persons having less than 3 income sources amounted to 95.2 vs. 70.2% in men and 98.0 vs. 87.5% in women for cases and controls respectively.

For two estimates of education – less than 8 schooling years and proportion of persons who never attended school – the difference was significant only at the total sample level. Since the difference between cases and controls was not significant within the age group 35–64 yrs, it implies that the connection of the level of education to hypertension could be attributed mainly to the connection of both education measures to age.

The relation of systolic and diastolic blood pressure to the number of income sources is also presented on Figure 2 for men and women separately. The blood pressure values are age-adjusted by means of multiple regression analysis and standardized residuals are presented for each income category. The tendency of blood pressure, irrespective of age, to be higher among those having no income and in those having a smaller number of income sources is visible in both sexes.

The extent to which hypertension is influenced by the years of education and income was also assessed using the forward stepwise method of the multivariate logistic analysis. Smoking status, BMI, length of education, and source of income, age, sex and region were considered as independent variables (Table 5).

In the course of the analysis different models were tested that considered various combinations of risk factors treated as a quantitative variable or qualitative variables with different cut-offs. The socio-economic status was represented by the total number of income sources (0–3) and years of education (0–12). Those two variables showed to be influential when categorized as low income 0–2 sources vs. 3 sources and less than 8 years of schooling (0–7) vs. 8+ (8–12) finished years of schooling (i.e. finished elementary school). The number of income sources
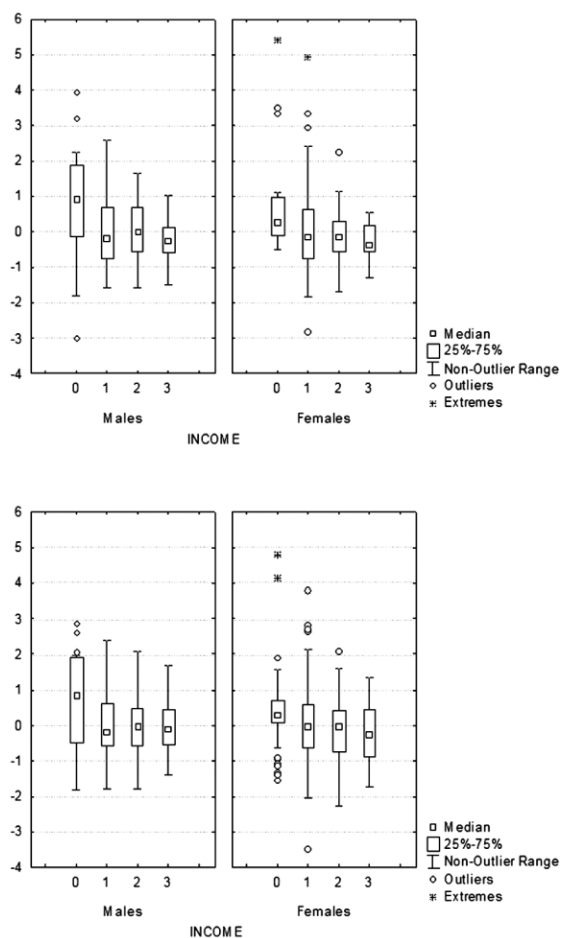
was equally significant predictor when represented as a quantitative variable.

The two best models both included the age and BMI (as quantitative variables) and sex, region, smoking status, schooling years (as categorical ones) (Table 5). In the first model, the income was included as a quantitative variable (with 4 categories) while in the second model it was treated dichotomously (0–2 vs. 3). Age and BMI, expectedly, showed to be the significant predictors for hyertension (at $p<0.001$ level), while sex, region and smoking status were not.

The hypertension was associated with a lower number of schooling years (OR=3.466, 95%CI=1.057–11.367, p=0.040) and fewer sources of income (OR=1.733, 95%CI=1.120–2.682, p=0.014). The risk for being hypertensive is increased for each year of life by OR=1.056 (95%CI=1.033–1.080, p<0.001) and for each unit of BMI by OR=1.166 (95%CI=1.107–1.229, p<0.001).

The second best model is the one using cut-off 3 for the number of income source while the other variables are the same as in the previous model. Here, the risk for hypertension is 5.5 times higher in persons who have 0–2 sources of income compared to those who have 3 different sources of income (OR=5.549, 95%CI=1.627–18.930, p=0.006). Both presented regression models explain 40% of variance of the dependant variable and are equally acceptable.

Discussion

The Bayash Roma of Croatia are a socio-economically marginalized minority population characterized by staggering high unemployment rate and high rate of illiteracy. Their society still sustains a system of internal moral norms and social rules. In our recent study[6] it was shown that the majority of Bayash population in Croatia lives in large groups, completely segregated from the rest of the population, in the outskirts of villages (e.g. Village of Krušanec in Međimurje or Torjanci in Baranja) or small towns (e.g. settlements of Zlatnica and Groblje in Darda or Rupa in Beli Manastir) with non-existent or unsatisfactory essential facilities, such as sewage, waterworks, garbage collection, or roads. The Bayash families sometimes cannot afford connection to existing public utilities[6]. Poverty and cultural specificities of the Bayash are the major reasons for the persistence of traditional lifestyle.

There is a strong cultural basis for obesity, tobacco use, fatty diet, and inbreeding present in this population – which all predispose them to hypertension and other CVD risk factors. The Roma, worldwide, are among the populations that are experiencing a rapid transition from traditional lifestyle, characterized by high levels of physical activity and a diet with relatively low energy, to a more sedentary lifestyle with an excess of caloric intake[16].

Arterial hypertension is a complex disorder that represents one of the most important modifiable risk factors for myocardial infarction, stroke, end-stage renal disease and peripheral vascular disease[17]. The other modifiable

CVD risk factors include dyslipidemia, unhealthy diet, physical inactivity and stress while non-modifiable risks are advanced age, gender, ethnicity, and familial susceptibility. The Interheart study[18] estimated that nine poten-

TABLE 5
MULTIVARIATE SCREENING FOR PREDICTOR VARIABLES FOR HYPERTENSION BY LOGISTIC REGRESSION. CODING: 1 – NORMAL BLOOD PRESSURE; 2 – HYPERTENSION. ABBREVIATIONS: OR – ODDS RATIO; CI – CONFIDENCE INTERVALS

Predictor variable	Predictors OR (95% CI)
	Hypertension
Region (Baranja = referent)	1.00
	1.035 (0.514–2.085)
	p = 0.923
Sex (male = referent)	1.00
	1.269 (0.703–2.293)
	p = 0.423
Smoker (no = referent)	1.00
	0.922 (0.494–1.721)
	p = 0.799
Education (0–7 yrs = referent)	1.00
	3.466 (1.057–11.367)
	p = 0.040
Age (years)	1.056 (1.033–1.080)
	p ≤ 0.001
BMI (kg/m²)	1.166 (1.107–1.229)
	p ≤ 0.001
Income (none = referent)	1.733 (1.120–2.682)
	p=0.014

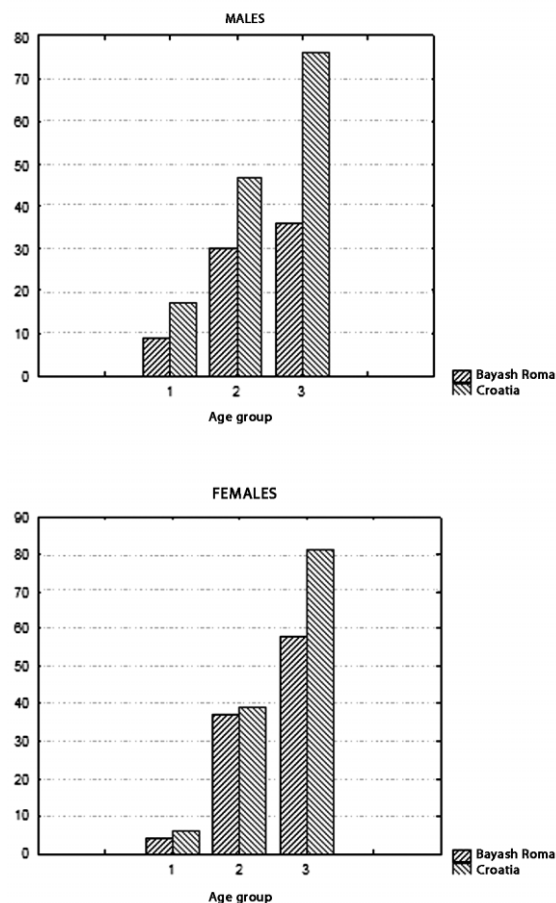| Predictor variable	Predictors OR (95% CI)
	Hypertension
Region (Baranja = referent)	1.00
	1.254 (0.638–2.462)
	p = 0.511
Sex (male = referent)	1.00
	1.321 (0.728–2.395)
	p = 0.359
Smoker (no = referent)	1.00
	0.886 (0.474–1.657)
	p = 0.706
Education (0–7 yrs = referent)	1.00
	3.682 (1.135–11.942)
	p = 0.030
Age (yrs)	1.059 (1.037–1.083)
	p ≤ 0.001
BMI (kg/m²)	1.178 (1.116–1.243)
	p ≤ 0.001
Income (0–2 sources = referent)	1.00
	5.549 (1.627–18.930)
	p = 0.006

Fig. 3. Comparison of the prevalence of hypertension in Bayash Roma and in general population of Croatia[23] by sex and age. Age groups: 1:18–34, 2:35–64, 3:65+.

tially modifiable risk factors contribute to more than 90% of CHD worldwide, and more than 95% of patients who died from CHD had at least one of the four traditional risk factors (smoking, hypertension, hyperlipidemia and diabetes)[18].

The significant association of hypertension with traditional CVD risk factors – age and BMI – was confirmed in the present study, while no association with smoking habits was found in this population. Smoking is a part of traditional Roma life-style and with 70% of smokers in the population[6] it can be assumed that almost the entire population is exposed to this risk factor in their family environment. Therefore, due to homogenously distributed risk from smoking, this factor did not show to be a significant predictor of hypertension.

The here presented results showed no differences in the prevalence of hypertension among regions and between sexes. The fact that the previous report[6] indicated that those differences existed, requires further explanation. It lies in the discrepancy of the definition of hypertension applied in the two studies. According to the first study, hypertensives were all those who had a diagnosed hypertension (who are under medication), while in the

present study the definition was expanded to all those with elevated measured blood pressure. When these broader criteria were applied, all regional and sex differences disappeared.

The prevalence of cardiovascular disease as well as morbidity and mortality due to other non-communicable diseases are increasing in transitional and developing countries. Croatia, with CVD mortality falling within the range 35%–65% of total mortality, is considered to be at the third stage of epidemiological transition. The CVD epidemic (predominantly ischemic heart disease and cerebrovascular disease) in transition countries is due to the increased rates of hypertension, obesity, smoking and sedentary lifestyle[18]. The decrease of CVD prevalence in developed countries is a well documented phenomenon. In accordance with this pattern are e.g. findings of significantly lower prevalence of hypertension (28 %; M: 29.8%; F: 25.8%) in USA[19], as an economically developed country, compared to Croatia (37.5%; M: 35.2; F: 39.7%)[19].

In economically developed countries the inverse relationship exists between the socio-economic status and the presence of CVD risk factors and CVD mortality[20]. For example, in 58 American Gypsies[10] the prevalence of hypertension is as high as 73%. Other contrasting examples of this relation are the »first nations« of Canada[21] and urban Swedes[22].

In spite of the above mentioned assumptions, the Bayash population in Croatia is characterized by a low prevalence of hypertension. Namely, we found that Bayash Roma had a much lower prevalence of arterial hypertension (24.8%) when compared with the general population of Croatia (27.7% – 44.2%)[19,23–24]. The analysis by age groups allow us to conclude that the lower prevalence of hypertension in Bayash than within the general population of Croatia[23] is not due to comparative younger average age of the Bayash sample (Figure 3). The comparison of hypertension prevalence in various countries within age group 35–64 yrs and applying the same criteria for hypertension revealed that the prevalence in Bayash is the lowest among European populations[25] and it falls near the levels found in USA and in Canada[25] (Table 6).

The expected connection of the low socio-economic status with the increase of cardiovascular disease risk factors is in sharp contrast to the findings of the present study. The vivid explanation for the obtained relations could be found in the work of Ezeamama et al. (2006)[20], who, within the context of socio-economic development in the Samoan archipelago, demonstrated the positive associations between the socio-economic status and traditional CVD risk factors at the early stages of economic development. Those authors also suggest that this relation changes along with the economic development of the population (Figure 4)[20]; with high incidence of traditional CVD risk factors characterizing the developing societies while their low incidence characterizes economically developed societies as well as the traditionally undeveloped societies.

In case that the above-described association between socio-economic status and cardiovascular disease risk

TABLE 6
PREVALENCE OF HYPERTENSION FOR THE AGE GROUP 35–64 YRS IN CROATIAN BAYASH ROMA COMPARED TO SEVERAL
EUROPEAN AND AMERICAN POPULATIONS[23,25]. THE SAME STANDARD CRITERIA FOR HYPERTENSION WERE USED IN ALL STUDIES
(I.E. BP ≥ 140/90 mm Hg OR TREATMENT WITH ANTIHYPERTENSIVE MEDICATION)

Population (listed by increasing order of prevalence)	Total (%)	Men (%)	Women (%)	M–W difference
Canada[25]	27.4	31.0	23.8	7.2
North America[25]	27.6	30.4	24.8	5.6
USA[25]	27.8	29.8	25.8	4.0
Bayash (present study)	35.0	30.4	37.2	–6.8
Italy[25]	37.7	44.8	30.6	14.2
Sweden[25]	38.4	44.8	32.0	12.8
England[25]	41.7	46.9	36.5	10.4
Croatia[23]	42.8	46.7	39.1	7.6
Europe[25]	44.2	49.7	38.6	11.1
Spain[25]	46.8	49.0	44.6	4.4
Finland[25]	48.7	55.7	41.6	14.1
Germany[25]	55.3	60.2	50.3	9.9

factors is universally applicable, we can hypothesize that the Bayash Roma population of Croatia – who in spite of their low socio-economic status and the presence of other risk factors for CVD are not developing hypertension – are socio-economically still in a »pre-developing stage«. If this assumption is valid, we can expect that along with the westernization of their life-style and the increase of their economic power the increase in prevalence of hypertension in Bayash Roma of Croatia will occur. However, it is interesting that among here presented Roma sample the »developed« model could be observed – with lower blood pressure values among the richer Roma.

Considering the relation between measured hypertension (mHT) and previously diagnosed hypertension (dHT) in Bayash population, it should be pointed out that as long as hypertension is not a prevalent health problem for Bayash Roma population, the given rates of inadequately treated hypertension are not alarming. But it has to be kept in mind that presently as much as 74% of persons with elevated BP do not have diagnosed hypertension. And if the prevalence of HT increases (which we expect to happen) the proportion of adequately treated persons in this population will be minute if the health care and health awareness remain at the present-day level. Bearing in mind the chronic nature of cardiovascular disease and its associated long-term disability, mortality and financial cost, it is crucial that effective early cardiovascular disease risk prevention be applied to Roma minority population in Croatia.

Summing up we can state that although the prevalence of hypertension in Croatia is within the range of other European populations, the Bayash Roma minority population is characterized by its lower frequencies. This interesting finding surely calls for attention and various environmental as well as genetic hypotheses (i.e. the impact of genetic isolation and inbreeding) should be tested more thoroughly in the future.

In stressing the need of CVD prevention, it is important to consider the necessity of socio-economic inclusion of marginalized and deprived groups into modern society as well as of the development of public health policy based on targeted preventive programs.

Conclusions

The prevalence of hypertension in the Bayash Roma is almost half the magnitude of what is usually reported for the general population of Croatia. The prevalence of hypertension in Bayash showed no significant difference between the region of Baranja and Međimurje. The significant association of hypertension with age and BMI was confirmed and the importance of non-traditional SES-related CVD risk factors was highlighted.
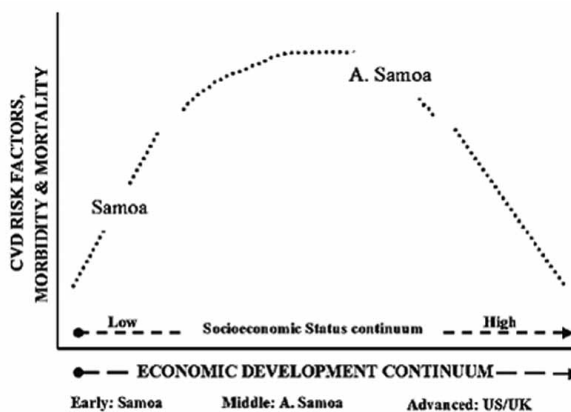

Fig. 4. Theoretical association between SES and CVD risk factors by level of economic development according to Ezeamama et al. (2006)[20]. /copyright permission has been requested from Soc. Sci. Med./

Although the relation of blood pressure level and SES indicators within this population was negative (as is commonly found in developed populations), low prevalence of hypertension along with poverty, persistence of traditional lifestyle, and presence of other risk factors for CVD requires taking this finding with precaution. Namely, we expect that in the future – with westernization of their life-style and the increase of their economic power – the prevalence of hypertension and other CVD in the population of Bayash Roma in Croatia will increase. Therefore, it is important to recognize the need for the early prevention of cardiovascular disease risk factors in this minority population.

REFERENCES

1. MURRAY CJL, LOPEZ AD (Eds), The global burden of disease: a comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. (Harvard School of Public Health, Boston, 1996). — 2. DAVEY SMITH G, EGGER M, BMJ, 307 (1993) 1085. — 3. KAPLAN GA, KEIL JE, Circulation, 88 (1993) 1973. — 4. KAPLAN GA, LYNCH JW, Prev Med, 29 (pt2) (1999) (pt2) S30-S35. — 5. KRIEGER N, Am J Public Health, 95 (2005) 2155. — 6. ŠKARIĆ-JURIĆ T, MARTINOVIĆ KLARIĆ I, SMOLEJ NARANČIĆ N, DRMIĆ S, PERIČIĆ SALIHOVIĆ M, BARAĆ LAUC L, MILIČIĆ J, BARBALIĆ M, ZAJEC M, JANIĆIJEVIĆ B, Croat Med J, 48 (2007) 708. — 7. YUSUF S, REDDY S, OUNPUU S, ANAND S, Circulation, 104 (2001) 2746. — 8. ZAJC M, SMOLEJ NARANČIĆ N, ŠKARIĆ-JURIĆ T, MILIČIĆ J, BARBALIĆ M, MELJANAC SALOPEK K, MARTINOVIĆ KLARIĆ I, JANIĆIJEVIĆ B, Coll Antropol, 30 (2006) 783. — 9. ŠKARIĆ-JURIĆ T, ZAJC M, SMOLEJ NARANČIĆ N, BARBALIĆ M, PERIČIĆ SALIHOVIĆ M, BARAĆ LAUC L, Coll Antropol, 30 (2006) 761. — 10. THOMAS JD, DOUCETTE MM, THOMAS DC, STOECKLE JD, Lancet, 2 (8555) (1987) 377. — 11. KRAJCOVICOVA-KUDLACKOVA M, BLAZICEK P, GINTER E, SPUSTOVA V, Bratisl Lek Listy, 103 (2002) 459. — 12. DOLINSKA S, KUDLACKOVA M, GINTER E, Bratisl Lek Listy, 108 (2007) 207. — 13. GOVERNMENT OF THE REPUBLIC OF CROATIA: National Programme for Roma: Action Plan for the Decade of Roma Inclusion 2005-2015. Available from URLI: www.vlada.hr/nacionalniprogramromi/. — 14. FRASER A, The Gypsies (Blackwell Publishers, Oxford, 1992). — 15. WEINER JS, LOURIE JA, Practical human biology. (Academic Press, New York, 1981). — 16. VOZAROVA DE COURTEN B, DE COURTEN M, HANSON RL, ZAHORAKOVA A, HEGYENES HP., TATARANNI PA, BENNETT PH, VOZAR J, Diabetes Res Clin Pract, 62 (2003) 95. — 17. BRANDY K, DICKSON ND, BLACKLEDGE J, IHAB MH, Am J.Med Sciences, 332 (2006) 211. — 18. CAREVIĆ, V., M. RUMBOLDT M, Z. RUMBOLDT Z, Acta Med. Croatica, 61 (2007) 299. — 19. JELAKOVIĆ B, Epidemiologija arterиske hipertenzije u Hrvatskoj. In Croat. (Predavanje: Simpozij: Prostorna distribucija populacijskih kardiovaskularnih rizika u Hrvatskoj, Akademija medicinskih znanosti Hrvatska, Zagreb, 2005). — 20. EZEAMAMA AE, VIALI S, TUITELE J, McGARVEY ST, Soc Sci Med, 63 (2006) 2533. — 21. ANAND SS, YUSUF S, JACOBS R, Lancet, 358 (2001) 1147. — 22. ENGSTROM G, JERNTROP I, PESSAH-RASMUSSEN H, Stroke, 32 (2001) 1098. — 23. ERCEG M, HRABAK-ŽERJAVIĆ V, IVIČEVIĆ U, HEMIK A, Hrvatska zdravstvena anketa: Povišen krvni tlak. In Croat. (Predavanje: Simpozij: Prostorna distribucija populacijskih kardiovaskularnih rizika u Hrvatskoj, Akademija medicinskih znanosti Hrvatska, Zagreb, 2005). — 24. TUREK S, RUDAN I, SMOLEJ-NARANČIĆ N, SZIROVICZA L, ČUBRILO-TUREK M, ŽERJAVIĆ-HRABAK V, RAK-KAIĆ A, VRHOVSKI-HEBRANG D, PREBEG Ž, LJUBIČIĆ M, JANIĆIJEVIĆ B, RUDAN P, Coll Antropol, 25 (2001) 77. — 25. WOLF-MAIER K, COOPER R, BANEGAS JR, S. GIAMPAOLI S, HENSE HW, JOFFRES M, KASTARINEN M, POULTER N, PRIMATESTA PRODRIGUEZ--ARTALEJO F, STEGMAYR B, THAMM M, TUOMILEHTO J, VANUZZO D, VESCIO F, JAMA, 289 (2003) 2363.

T. Škarić-Jurić

Institute for Anthropological Research, Gajeva 32, 10000 Zagreb, Croatia
e-mail: tanja@inantro.hr

TRADICIONALNI KARDIOVASKULARNI ČIMBENICI RIZIKA I SOCIOEKONOMSKA OSKUDICA U MANJINSKOJ POPULACIJI ROMA HRVATSKE

SAŽETAK

Istraživanja zdravstvene jednakosti konzistentno pokazuju da različite etničke manjinske skupine nisu ravnopravne većinskoj populaciji u odnosu na zdravstveni status, morbiditet i mortalitet. Današnja znanja o prevenciji kardiovaskularnih bolesti (CVD) uglavnom potječu iz studija koje su provođene u populacijama europskog porijekla dok su dokazi koji uključuju romsku populaciju vrlo rijetki. Romi su manjinska etnička skupina porijeklom iz sjeverne Indije, poznata po očuvanoj tradiciji i otporu prema asimilaciji. Romi žive u različitim državama širom svijeta u kojima su najčešće ekonomski, prostorno, politički i kulturno marginalizirani. Kako bi se procijenio zdravstveni status Roma Bajaša i obilježja njihovog životnog stila koja su od značaja za zdravlje, u dvije hrvatske regije provedeno je multidisciplinarno antropološko i epidemiološko istraživanje koje je uključilo 144 muškarca i 279 žena, starih 18–84 godina. Procijenjeno prema standardnom dijagnostičkom kriteriju (tj. izmjereni krvni tlak ≥ 140/90 mm Hg ili uzimanje antihipertenzivne terapije) hipertenzija je prisutna kod 24,8% Roma Bajaša (21,5% kod muškaraca i 26,5% kod žena). Prevalencija raste od 5,9% u dobnoj skupini 18–34, u dobnoj skupini 35–64 iznosi 35,0%, dok u dobnoj skupini osoba starih 65 i više godina ona izno-

si 51,4%. Prevalencija hipertenzije u Roma Bajaša gotovo je dvostruko niža od one u općoj populaciji Hrvatske. Ona je također niža u usporedbi s drugim europskim populacijama, pri čemu taj nalaz nije posljedica mlađe prosječne dobi romskog uzorka. Značajna povezanost hipertenzije s dobi i indeksom tjelesne mase u ovoj je studiji potvrđena ali je također rasvijetljena i uloga ne-tradicionalnih čimbenika rizika povezanih sa socioekonomskim statusom. Pušenje je dio tradicionalnog načina života Roma te je uz 70% pušača čitava zajednica u svom obiteljskom okolišu podjednako izložena ovom čimbeniku rizika. S obzirom da je ovaj čimbenik rizika homogeno distribuiran, ne čudi što se on nije pokazao značajnim prediktorom hipertenzije. Razmjer u kojem je hipertenzija pod utjecajem tradicionalnih čimbenika rizika te nekih indikatora socioekonomskog statusa procijenjen je također multivarijatnom logističkom analizom. Svaki čimbenik rizika analiziran je i kao kvantitativna i kao kvalitativna varijabla uz korištenje različitih graničnih vrijednosti. Pokazalo se da je najbolji model onaj koji ima dob i indeks tjelesne mase kao kvantitativne varijable te dob, regiju, pušački status, broj izvora prihoda i broj godina školovanja kao kategorijske varijable (s graničnom vrijednošću 3 za broj izvora prihoda i 8 za broj godina školovanja). Unatoč niskoj prevalenciji hipertenzije, prikazani rezultati pokazuju da su Romi Bajaši u velikoj mjeri opterećeni kardiovaskularnim čimbenicima rizika. Mi očekujemo da će modernizacijom njihovog životnog stila i porastom ekonomske moći, učestalost kardiovaskularnih bolesti u ovoj populaciji porasti. Stoga je važno prepoznati potrebu rane prevencije čimbenika rizika za kardiovaskularne bolesti u ovoj manjinskoj populaciji.