

Lifestyle predictors of hypertension in the adult population of post-war Kosovo

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Abstract

Aim: We have previously reported on the prevalence and socioeconomic predictors of hypertension in the adult population of transitional Kosovo. The aim of this study was to assess the association of hypertension with lifestyle/behavioral factors in the adult men and women in Kosovo.

Methods: A cross-sectional study was conducted in Pristina in 2012-2013 including a representative sample of 1793 consecutive primary health care users aged ≥ 35 years (mean age: 51.2 ± 6.7 years; 52.5% women; overall response rate: 95%). All participants were measured their systolic and diastolic blood pressure. Data on lifestyle factors (including smoking, alcohol intake, physical exercise and dietary fat intake), demographic factors and socioeconomic characteristics were also collected. Binary logistic regression was used to assess the association of hypertension with lifestyle/behavioral factors.

Results: The prevalence of hypertension was 38.9% in men and 28.8% in women. In crude logistic regression models, hypertension was positively related to smoking (OR=1.78, 95%CI=1.39-2.30), excessive alcohol consumption (OR=2.53, 95%CI=1.78-3.66), physical inactivity (OR=2.71, 95%CI=1.67-3.86) and excessive dietary fat intake (OR=2.21, 95%CI=1.53-3.09). Upon simultaneous adjustment for socioeconomic characteristics and lifestyle factors, significant "determinants" of hypertension were smoking (OR=1.64, 95%CI=1.24-2.07) and physical inactivity (OR=2.13, 95%CI=1.42-2.94).

Conclusions: Our findings point to a deleterious effect on coronary health of behavioral factors in this representative sample of the adult population in Kosovo. There is an obvious need for policymakers and health promotion specialists in Kosovo to implement effective programs and activities in order to control and prevent the negative health outcomes related to hypertension.

Keywords: alcohol intake, behavioral factors, fat consumption, high blood pressure, hypertension, Kosovo, lifestyle factors, physical activity, smoking.

Introduction

Hypertension is a well-known major risk factor for cardiovascular morbidity and mortality in both men and women worldwide. This fact was systematically evidenced in many studies and was confirmed also by the Global Burden of Disease Study update for 2000 (1), and the more recent update for 2010 (2,3). Currently, hypertension is one of the leading global risks for mortality, being responsible for 9.4 million deaths in 2010 (4). This substantial burden of disease associated with hypertension has been reported in any large international studies (3). It should be noted that increased blood pressure contributes to cardiovascular and cerebrovascular endpoints, such as myocardial infarction, heart failure, cardiovascular death and stroke (4).

In Kosovo, the newest state in Europe, mortality trends of chronic diseases including cardiovascular diseases are similar to the adult mortality trends and life expectancy in both sexes. Notwithstanding the lack of well-documented evidence and the absence of official reports, stroke mortality in Kosovo is substantially higher than in the European Union member states, a situation which is similar to many countries in the Western Balkans and other former communist countries in Central Europe. Thus, changes in cardiovascular disease mortality account for the noticeable changes in the overall mortality patterns in transitional Kosovo. Nonetheless, according to the Household Budget Survey conducted in Kosovo in 2011, the prevalence of smoking in the population of Kosovo aged ≥ 15 years (13.0% in the overall population) is lower than in other countries of the Western Balkans including the neighboring Albania (5).

To date, information on the prevalence and determinants of hypertension in the adult population of Kosovo are scarce. We have previously reported on the prevalence and socioeconomic predictors of hypertension in the adult population of transitional Kosovo (6). However, little is known about behavioral correlates of hypertension (including cigarette smoking, alcohol intake, physical exercise, or dietary patterns) in the population of Kosovo. The aim of this study was to assess the association of hypertension with lifestyle/ behavioral factors in the adult men and women in Kosovo. We based our analysis on the same representative sample of

primary health care users as reported in our previous article on the prevalence and socioeconomic determinants of hypertension in Kosovo (6).

Methods

A cross-sectional study was conducted in Pristina, the capital city of Kosovo, in 2012-2013.

Study population and sampling

A sample of 2000 consecutive primary health care users aged ≥ 35 years was invited to participate in the study. Calculation of the sample size was made by use of WINPEPI (Program for Epidemiologists) for several hypotheses related to the prevalence and behavioral determinants of hypertension including smoking, alcohol intake, physical exercise and dietary fat consumption. The significance level (two-tailed) was set at 5%, and the power of the study at 80%. Based on the most conservative calculations, the required minimal size for a simple random sample was about 1700 individuals. We decided to recruit 2000 individuals in order to account for non-response. Of the 2000 targeted individuals, 207 did not participate in the study (113 individuals were not eligible, whereas further 94 individuals refused to participate). Overall, 1793 primary health care users were included in this study (response rate: $1793/1887=95\%$). It should be noted that the response rate was similar in men and women.

Data collection

All participants were measured their systolic and diastolic blood pressure (6). Measurement of blood pressure was done with an electronic sphygmomanometer three times in the right arm (with a one-minute pause in between), after the subject was seated for five minutes in a quiet room, during which the cuff was attached. The average of the 2nd and the 3rd measurements was used in the analysis. Hypertension was defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or self-reported treatment for hypertension regardless of the measurement values (6). Assessment of lifestyle/ behavioral factors included smoking status (dichotomized in the analysis into: current and/ or past smokers vs. no smokers), alcohol intake (dichotomized in the analysis into:

excessive alcohol intake vs. no/ low/ moderate intake), physical exercise (categorized in the analysis into: low, moderate and high) and dietary fat intake (categorized in the analysis into: low, moderate and high).

Data on socio-demographic factors (sex, age, place of residence [urban vs. rural area] and marital status [married vs. single/ divorced/ widowed]) and socioeconomic characteristics (educational level [low, middle, high], employment status [employed, unemployed, pension] and income level [low, middle, high]) were also collected (6).

The survey was approved by the Kosovo Board of Biomedical Ethics. All individuals who agreed to participate in the study gave their informed consent.

Statistical analysis

Binary logistic regression was used to assess the association of hypertension (dichotomous/ binary variable) with lifestyle/ behavioral factors (smoking, alcohol intake, physical exercise and dietary fat intake). Crude/ unadjusted odds ratios (ORs) and their respective 95% confidence intervals (95% CIs)

were initially calculated. Subsequently, all socio-economic variables and lifestyle/behavioral variables were entered simultaneously into the logistic regression models. Multivariable-adjusted ORs and their respective 95% CIs were calculated. Hosmer-Lemeshow test was used to assess the goodness of fit of the logistic regression models. Statistical Package for Social Sciences, version 17.0, Chicago, Illinois, was used for all the statistical analyses.

Results

Mean age of study participants was 51.2 ± 6.7 years. There were 851 (47.5%) men and 942 (52.5%) women in the study sample. Overall, about 57% of survey participants were urban residents and 86% were currently married. Unemployment rate was relatively high in this sample (33%), which was also reflected in a high proportion of self-reported low income level (39%) [data not shown].

The prevalence of hypertension in this study sample was $602/1793=33.6\%$. It was higher in men (331, or 38.9%) than in women (271, or 28.8%) [Figure 1].

Figure 1. Prevalence of hypertension in a large representative sample of adult men and women in Kosovo (N=1793) in 2012-2013

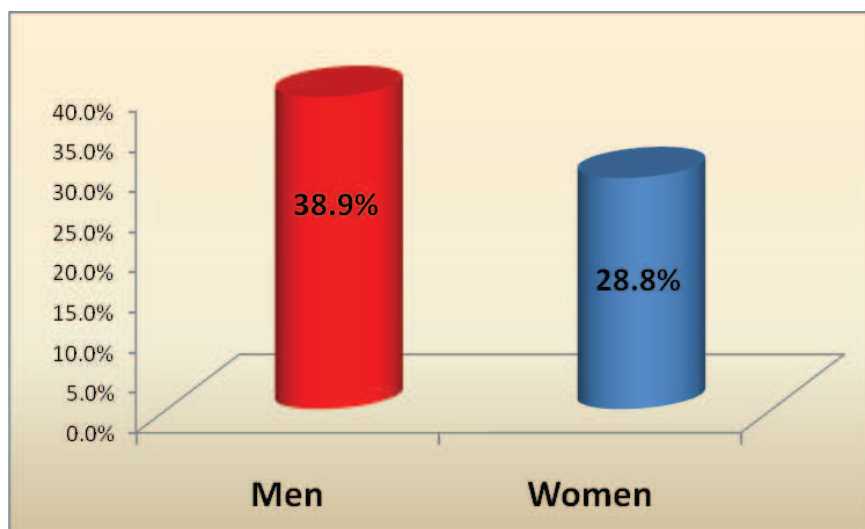


Table 1 presents the distribution of lifestyle characteristics of study participants by hypertension status. The prevalence of smoking was significantly higher in individuals with hypertension compared with those without hypertension (28.0% vs. 17.9%, respectively). Similarly, excessive alcohol intake was

considerably higher among participants with hypertension compared with those without hypertension (16.3% vs. 7.1%, respectively). A sedentary lifestyle was reported more frequently among individuals with hypertension (40.4%) compared with participants without hypertension (26.9%).

Finally, excessive fat intake was more prevalent among hypertensive subjects (17.9%) than in individuals without hypertension (9.0%). Table 2 presents the crude/ unadjusted association

Table 1. Distribution of lifestyle/ behavioral factors in a large representative sample of adult men and women in Kosovo (N=1793) in 2012-2013

Lifestyle/behavioral factor	Numbers (column percentages)	
	No hypertension (N=602)	Hypertension (N=1191)
Present or past smoker:		
No	494 (82.1)	857 (72.0)
Yes	108 (17.9)	334 (28.0)
Excessive alcohol intake:		
No	559 (92.9)	997 (83.7)
Yes	43 (7.1)	194 (16.3)
Physical activity:		
Low	162 (26.9)	481 (40.4)
Moderate	293 (48.7)	549 (46.1)
High	147 (24.4)	161 (13.5)
Fat intake:		
Low	234 (38.9)	417 (35.0)
Moderate	314 (52.1)	561 (47.1)
High	54 (9.0)	213 (17.9)

of hypertension with lifestyle/ behavioral factors. Hypertension was positively related to smoking (OR=1.78, 95%CI=1.39-2.30), excessive alcohol consumption (OR=2.53, 95%CI=1.78-3.66), physical inactivity (OR=2.71, 95%CI=1.67-3.86) and excessive dietary fat intake (OR=2.21, 95%CI=1.53-3.09). Upon simultaneous adjustment for demographic and socioeconomic characteristics and other lifestyle factors, significant “determinants” of hypertension were smoking (OR=1.64, 95%CI=1.24-2.07) and

Table 2. Association of hypertension with lifestyle/ behavioral factors in a large representative sample of the adult population in Kosovo (N=1793) in 2012-2013

Variable	OR (95%CI)*	P*
Present or past smoker:		
No	1.00 (reference)	<0.01
Yes	1.78 (1.39-2.30)	
Excessive alcohol intake:		
No	1.00 (reference)	<0.01
Yes	2.53 (1.78-3.66)	
Physical activity:		
Low	1.00 (reference)	<0.01 (2) [†]
Moderate	1.58 (1.14-3.21)	-
High	2.71 (1.67-3.86)	<0.01
Fat intake:		
Low	1.00 (reference)	<0.01 (2) [†]
Moderate	1.01 (0.78-1.39)	-
High	2.21 (1.53-3.09)	0.98

* Odds ratios (ORs), 95% confidence intervals (95%CI) and p-values from binary logistic regression.

† Overall p-value and degrees of freedom (in parentheses).

physical inactivity (OR=2.13, 95%CI= 1.42-2.94) [data not shown in the tables].

Discussion

In this study including a representative sample of primary health users of both sexes in Kosovo, there was evidence of a strong positive relationship between hypertension and lifestyle/ behavioral factors. Thus, smoking and physical inactivity were strong and significant “predictors” of hypertension even upon multivariable adjustment for a wide array of demographic and socioeconomic characteristics, as well as other lifestyle factors including excessive alcohol intake and dietary fat consumption.

Overall, in our study sample there was a relatively high prevalence of hypertension, which raises serious concerns for health care professionals and decision makers in the health sector in Kosovo. Furthermore, the prevalence of hypertension was considerably high particularly among men and the most vulnerable socioeconomic segments of the population (the unemployed and the low-income groups) [6]. The prevalence of hypertension in our study in Kosovo was higher compared with a previous study from Albania, which also reported a strong positive association between cigarette smoking and acute coronary syndrome in adult men and women (7). The strong positive relationship between hypertension and physical inactivity is consistent with previous reports from the neighboring Albania which have also linked a sedentary lifestyle to diabetes (8) and acute coronary syndrome (9).

There is mounting evidence from the international literature linking high levels of systolic and diastolic blood pressure with stroke, and the ischemic heart disease (3,4). Therefore, there have been consistent reports suggesting that hypertension is the number one risk for mortality because of its dominant role in cardiovascular pathogenesis (3,4).

In addition to these facts, for transitional countries of the Western Balkans including Albania and Kosovo, the rapid pace of transition and its inherent association with hypertension (10), including also the reduced energy expenditure and the consequent obesity, bear important implications for both the health care and health promotion sectors in these countries (6).

Despite the evidence on a fall in blood pressure levels during the last decade in Europe, it has been

argued that hypertension will remain one of the most important cardiovascular risk factors given the ageing trend of the population worldwide (4). Therefore, in order to control and prevent the magnitude and burden of hypertension at a population level, the well-known suboptimal hypertension control rates should be of great concern to health care professionals (4). At the same time, intensive efforts should be done in order to identify and test new strategies for an improvement in awareness and effective treatment for hypertension, which are crucial measures to control the extent of hypertension at a population level (4,6).

It must be said that our study may suffer from different limitations including the sample representativeness (selection bias) and potential information biases. In our study, we included a large sample of consecutive primary health care users of both sexes. Furthermore, the response rate in our study was very high (95%). Also, respondents and non-respondents did not differ significantly in terms of age and sex. Therefore, there is no evidence of selection bias in our study sample. Regarding the possibility of information bias, we applied standard procedures of systolic and diastolic blood pressure measurements in all study participants (6). However, the information on lifestyle/ behavioral factors was based on self-reports, similar to the demographic and socioeconomic characteristics. Hence, we cannot exclude entirely the possibility of differential reporting of the lifestyle factors between different groups of individuals distinguished by the presence of hypertension. Last but not least, associations reported in cross-sectional studies should always be interpreted with great caution, because such associations are not considered to be causal. From this point of view, future prospective studies in Kosovo and other transitional settings should confirm and replicate results of this study.

In conclusion, our findings point to a deleterious effect on coronary health of behavioral factors in this representative sample of the adult population in Kosovo. There is an obvious need for policymakers and health promotion specialists in Kosovo to implement effective programs and activities in order to control and prevent the negative health outcomes related to hypertension.

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