ORIGINAL ARTICLE

Identification of conditions which lead to unjustified requests for emergency treatment of hypertensive patients

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ABSTRACT

Aim To determine most common factors making patients with high blood pressure seek professionally unacceptable treatment of hypertension at the Emergency Department.

Methods The survey was conducted at the Emergency Department of the Primary Health Care in Gradačac on randomly selected 207 patients who requested medical help because of high blood pressure. For all patients arterial blood pressure and body mass index (BMI) were measured. A survey about knowledge and attitudes regarding habits that affect high blood pressure as well as the socio-economic conditions was made.

Results Prevalence of 10.3% was found with regard to visits to emergency care by patients due to high blood pressure. Most patients, 127(61.4 %), were overweight and 36(17.4%) were obese. Patients who rarely controlled their blood pressure were more frequent visitors of emergency medical services. Stressful situation occurs as a factor in a variety of forms. The survey showed that 76 (36.7%) patients sought medical help even though they had no blood pressure values that required emergency care.

Conclusion Poorly organized health care system with no continuous and comprehensive preventive promotional programs caused by inappropriate use of resources in health care. The reorganization of primary care with full implementation of family medicine and greater integration of family medicine with other levels of the health care system should provide a better control and treatment of other diseases such as hypertension.

Keywords: Emergency Department, hypertension, health services needs and demand

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INTRODUCTION

High blood pressure (hypertension) is a significant public health problem. In the adult population, it presents in 25 to 31% of the population; beside hypercholesterolemia, smoking, and diabetes it is the leading risk factor for cardiovascular and cerebrovascular diseases (1). In about 65% of cases of heart attacks and 72% of stroke, patients had high blood pressure (2). Hypertensive cardiovascular disease is now considered as the fourth leading cause of disability worldwide (3). The hypertensive disease burdening the population requires a significant effort of health care services and all other social factors for prevention and proper treatment of the disease. A key role in the proper management and treatment of hypertensive patients should be in primary health care especially in family medicine and in some cases by specialties of general internal medicine (4).The role of the family medicine physician is reflected in raising awareness among the population, early detection and proper management of the patient's treatment (5). It should be noted that a good patient-doctor relationship and confidence in health care professionals are very important for good patient's response to the recommended treatment (5). According to some studies low compliance of the patient is one of the most important reasons for having only about 30% of hypertensive patients in the world have experienced normalization of blood pressure (6).

The treatment regime and its implementation are responsibility of a patient on one side, and the family medicine team on the other one, who should take care of regular controls of these patients with the aim of preventing complications of hypertension (5). Patients should come for regular visits to the family medicine physician or other members of the team and should be on proper diet and regularly use the prescribed treatment (7). This behaviour should not lead to excessive situations that require a drastic change in the treatment of the patient, as well as requests for urgent treatment, except for the newly established state of the patient, which can lead to excess blood pressure (8). The treatment of hypertensive patients in the Emergency Department is justified only in extreme situations rather than an alternative to the treatment of the family medicine team (8). A physician in the Emergency Department does not have all the aspects that influence high blood pressure and cannot prescribe treatment for a longer period. Also, the daily treatment of hypertensive excesses in the Emergency Department is not recommended neither for the safety of the patient nor is it an effective treatment for patients (9).

Hypertensive crisis is a fatal condition, which is defined by values of systolic pressure, which usually exceed 180 mmHg systolic and 120 mmHg diastolic blood pressure. In practice, Anglo-Saxon classification of the hypertensive crisis is accepted, depending on the course of the treatment and prognosis. According to this classification hypertensive crisis is divided into two large groups: I Class hypertensive emergencies and II Class hypertensive urgencies (10). The division of the urgency and the emergence is going to determine therapeutic approach of hypertensive crisis. Hypertensive urgency requires outpatient treatment using the oral therapy with the goal of lowering blood pressure by 25% in the first 24 hours (11). Hypertensive emergencies requiring the use of parenteral therapy with the aim of pressure decrease by 25% within 1-2 hours; 30-60 mmHg for systolic, and diastolic 110 mm Hg below (11).

About 1% of hypertensive patients experience acute hypertensive crisis requiring immediate medical attention (12). The most common cause of hypertensive crisis is uncontrolled essential hypertension (13).

Numerous reports indicate that hypertensive patients are frequent visitors to the Emergency Departments (14). According to some studies those patients make one quarter of visits to Emergency Departments (12). Some studies in Bosnia and Herzegovina investigated characteristics of patients and a type of hypertensive crisis in emergency services but did not consider social characteristics of the patients (15,16).

The aim of this research was to investigate the reasons why patient go "to treat" high blood pressure in the emergency medical care centres and how conditions of the social environment influence this attitude.

PATIENTS AND METHODS:

Patients and study design

The cross-sectional study was performed in the period February - April 2016 at the Emergency

Department of Primary Health Care (ED) in Gradačac. In that period, 7826 patients visited the service. According to the physicians, 804 came because of the problem with hypertension. Consents for participation in the study were given and signed by 207 patients who had had hypertension problems and voluntarily agreed to participate in the study.

Emergency Department's nurses measured blood pressure and interviewed patients according to methodological physicians' instructions. Exclusion criteria were mental and physical disability. Besides the measurement of arterial pressure, body mass index (BMI) was calculated.

Methods

Blood pressure was measured two times with the mercury sphygmomanometer having the patient placed in a sitting position and rested. The calculated mean value of arterial pressure was entered in the questionnaire (17). The values of mean arterial pressure (MAP) calculated using the formula MAP = [(2 x diastolic) + systolic] / 3 (18). The European Society of Hypertension classifies hypertension into 7 categories (optimal, normal, high normal, grade 1 hypertension, grade 2 hypertension, grade 3 hypertension and isolated systolic hypertension (9).

Body mass index was calculated for adults by the formula BMI = weight / height ^{2}. The WHO Expert Committee classifies BMI into 4 categories and a few subcategories (underweight, normal range, overweight and obese) (19).

The questionnaire consisted of four groups of questions in order to determine factors which may contribute to worsening of hypertension and cause the patient's request for medical emergencies: the first one to identify basic anthropological and health characteristics of the patients (gender, height, weight, blood pressure); the second group of questions was related to knowledge and attitudes of patients (education, knowledge of blood pressure, taking therapy, regular blood pressure control); the third group of questions explored patients' habits (fatty and salty foods, antihypertensive diet, physical activity and smoking) and the last group of questions was related to socioeconomic conditions in which the patients lived (place of residence, employment, family status, health insurance).

Statistical analysis

The data were processed by methods of descriptive and inherent statistics. For parametric data, student's t test was used, and for nonparametric one $\chi 2$ test was used. Statistical significance was set for $p<0.05$.

RESULTS

In the period February- April 2016 a total of 7,826 patients visited the Emergency Department of Primary Health Care in Gradačac, 804 (10.3%) of which come due to the problem with high blood pressure. A total of 207 (out of 804; 25,7%) patients with hypertension were interviewed. Among 207 patients examined, 94 (45.4%) were males and 113 (54.6%) females with the average age of 60.74 years.

Forty-four (21.3%) patients had normal weight, 127 (61.4%) were overweight; of 36 (17.4%) obese patients 16 (7.7%) were males and 20 (9.7%) females. The average BMI for males was 27.86 and 27.30 for females (overweight) ($p> 0.05$) (Table 1).

Table 1. Characteristics of patients according to gender and place of living

	No (%) of patients				
	Urban		Rural		Total
	Males	Females	Males	Females	
Body mass index (BMI)					
Underweight (< 18.50)	0	0	0	0	0
Normal range (18.50 – 24.99)	4 (4.1)	20 (20.4)	11 (10.1)	9 (8.3)	44 (21.3)
Overweight (25.00 – 29.99)	36 (36.7)	24 (24.5)	27 (24.8)	40 (36.7)	127 (61.4)
Obese (≥30.00)	10 (10.2)	4 (4.1)	6 (5.5)	16 (14.7)	36 (17.4)
Total	50 (51)	48 (49)	44 (40.4)	65 (59.6)	207 (100)
Age years (mean)	60	58	60	64	60.74
Comorbidities					**p**
hyperglycemia	12(12.2)		26 (23.9)		<0.05
kidney disease	7 (7.1)		11 (10.5)		>0.05
thyroid disease	4 (4.1)		8 (7.3)		>0.05
hyperlipidemia	54 (55.1)		41 (37.6)		<0.05
neurosis	32 (32.7)		33 (30.3)		>0.05
Blood pressure (mean) (mmHg)	125.93	125.71	127.27	126.56	126.36

Patients from rural areas had slightly higher BMI of 0.5 (mean: 27.82 for rural and 27.25 for urban areas) ($p> 0.05$) (Table 1). Statistically significant difference was not found in gender distribution in relation to place of residence: 50 (51%) males and 48 (49%) females in urban and 44 (40.4%)

and 65 (59.6%) in rural areas, respectively (p> 0.05). A statistically significant difference in the average age of patients living in urban and rural place of residence was found, 58.86 and 62.44, respectively (p <0.05). Hypertensive patients from rural communities had frequently suffered from diabetes, kidney disease and thyroid disease, and in the urban ones neurosis and hyperlipidemia were more fruequent (p <0.05) (Table 1).

There were no significant differences in the average mean value of arterial pressure between males and females, 126.5 mmHg and 126.1 mmHg, respectively (p> 0.05), nor in the relation to the place of living, e. g. urban and rural community, 125.8 mmHg and 126.8 mmHg, respectively (p> 0.05).

The patients who rarely (weekly) controlled blood pressure, and those who controlled blood pressure by themselves more frequently requested medical help comparing to the patients who controlled it daily and whose blood pressure was measured by professional staff (p<0.05) (Table 2).

The level of education of hypertensive patients did not affect significantly the frequency of requests for medical emergencies (p> 0.05) (Table 2).

Table 2. Mean arterial pressure (mmHg) in relation to the frequency of control, persons who measured it, and the level of patients' education

	No (%) of patients	Mean value of blood pressure (mmHg)	Std. dev.	Std. error of mean
Frequency of blood pressure control				
daily	86 (41.5)	126.8798	8.14010	0.87777
per week	121 (58.5)	125.9945	10.47976	0.95271
Blood pressure measured by				
myself	133 (64.3)	126.4912	9.46098	0.82037
nurse	16 (7.7)	126.5104	9.24571	2.31143
doctor	58 (28.0)	126.0259	10.03846	1.31811
Level of patients' education				
Elementary School	86 (41.5)	126.9128	9.69218	1.04513
High School	96 (46.4)	125.8594	9.30671	0.94986
University education	25 (12.1)	126.4000	10.38250	2.07650
Total	**207 (100)**	**126.3623**	**9.56598**	**0.66488**

Among factors which may contribute to worsening of hypertension and cause the patient's request for medical emergencies, 122 (58.9%) claimed to adhere to antihypertensive diet; 120 (58%) and 141 (68.1%) patients liked fatty and salty food, respectively. Those who use fatty food have statistically significantly higher blood pressure (p<0.05).

Physical activity was claimed by less than a third of patients; 62 (30%) and 83 (40.1%) patients who requested emergency intervention were smokers.

A total of 145 (70%) patients who requested medical help were employed; 47 (22.7%) claimed very stressful workplace; 166 (80.2%) were married; 31 (15%) had severe family problems. Health insurance covered all patients. Antihypertensive therapy was mostly regularly used,170 (82.1%) patients.

According to the previously established criteria for hypertensive crisis (acute increase in blood pressure with systolic pressure usually exceeding 180 mmHg and diastolic over 120 mmHg urgent medical help should have been requested by 86 (41.5%) patients (Table 3). Altogether, 132 (63.7%) patients who had hypertension and other risk factors (comorbidities) (Table 1) reasonably requested emergency medical assistance.

Table 3. Frequency of blood pressure measurements in 207 patients according to hypertension categories

Category of hypertension	Systolic (mmHg)		Diastolic (mmHg)	N(%) of patients
Optimal	< 120	and	< 80	1 (0.5)
Normal	120 – 129	and/or	80 - 84	1 (0.5)
Normal high	130 – 139	and/or	85 - 89	2 (1)
Hypertension 1. stage	140 – 159	and/or	90 - 99	13 (6.3)
Hypertension 2. stage	160 – 179	and/or	100 - 109	72 (34.8)
Hypertension 3. stage	> 180	and/or	> 110	86 (41.5)
Isolated systolic hypertension	> 140	and/or	< 90	(15.5)

DISCUSSION

In our study, which was conducted in the municipality of Gradačac, prevalence of hypertensive patients of all those who had requested help at the emergency department was 10.3%, which is significantly lower than the results of IDACO study (14). Probably, the reasons for this better indicator are twofold: firstly, good availability of the emergency department, and secondly, an effective prevention program. Inaccessibility (the existence of potential barriers to visit emergency department) can be excluded, because we have not found significant difference in the number of patient requests nor in their place of living, gender, age, or the health insurance of patients, suggesting that the primary health care services (especially family medicine) are more efficient in carrying out preventive and educational programs. Our research found frequent appearance of overweight people, suggesting poor population life habits. This is consistent with the Framingham Heart Study showing that 78% males and 65% females with hypertension

were overweigh (9). Although it is not statistically significant, slightly higher values of BMI were found in the rural area, which could also be a cause of slightly higher blood pressure in those patients. Moderate weight loss (with or without the reduction in sodium intake) could prevent the occurrence of hypertension in overweight people. This is confirmed by meta-analysis (randomized controlled clinical studies) showing that the loss of 5.1 kg of body weight lowers systolic blood pressure by 4.4 mmHg and diastolic blood pressure by 3.6 mmHg, which highlights the importance of reduction in body weight and maintaining a stable weight value (20).

Our research has shown that a large number of patients who requested help in the emergency department because of hypertension had one or more comorbidities. In the rural area hypertensive patients often suffered from diabetes, kidney disease, and thyroid disease, while in the urban areas from neuroses and disorders of increased blood lipids. Research conducted in hypertensive adults in the United States in 2017 showed that 14.0% of patients did not have any comorbidities, 23.0% had one, 24.4% had two, and 38.7% had three or more (21).

Patients who often control the arterial blood pressure showed a greater degree of responsibility for their health, and therefore more appropriately use prescribed treatments. Our research has shown that those who more frequently require treatments in the emergency department are those who less frequently control the pressure. Additionally, in most cases, patients who self-controlled blood pressure (at home) had a higher level of education, but more frequent visits to ED were registered in patients with elementary and high school education, suggesting that lower general and specific knowledge might contribute to poor understanding of the disease and the role of ED.

In addition to genetic predisposition of the person, characteristics of high blood pressure are significantly affected by external factors, such as lifestyle or habits, behaviour, social role and a number of other social factors (22). There are several variable factors which can significantly influence the absence of proper controls of blood pressure in patients, such as obesity, physical inactivity, stress, excessive alcohol consumption or excessive consumption of salt and fatty foods (23). Health professionals for hypertensive patients preventively recommend antihypertensive diet, which was followed by about 59% of patients from our study; a large number of patients who requested intervention in the emergency department failed to comply with those recommendations, had bad lifestyle habits and added salt to food, as well as prefered fatty foods.

Recent studies confirmed that smoking can cause and worsen pre-existing hypertension (24), which is confirmed in our study too.

Physical activity is also an important factor influencing the occurrence and characteristics of high blood pressure, and health care professionals regularly recommend it to the patients. Today's daily work duties, sedentary lifestyle and lack of support from the community for physical activity result in insufficient physical activity. In our study very few of those who applied for the treatment of hypertension in the emergency department were engaged in regular physical activity, and they had lower values of (mean) arterial pressure.

Anxiety leads to an acute increase in blood pressure, but over time more consecutive stressful situations lead to a chronic increase in blood pressure as confirmed by our research (25).

Single life is a stressful factor for some persons, but most of those who requested intervention were married. Adverse economic living conditions (low or no income, e. g. poor living conditions, poor nutrition, difficulty to obtain basic necessities of life, inability to purchase drug treatment, as well as unemployment, expensive rents, debts ...) could also be stressful (26) and influence higher blood pressure, which is conformed in the presented study.

The causes of hypertension are numerous and sometimes not explored enough, but the methods and protocols for the prevention of disease and complications of hypertension and its treatment are very well known (9). In our setting we do not have clearly defined guidelines of good practice, clearly planned prevention programs. There is a poorly organized health system often not enabling appropriate action of patients and health care professionals (27). All those factors cause inadequate therapeutic and preventive response and they are in the domain of social activity and organization

of health care, actually those are social factors. The ALLHAT and CONVINCE studies showed unsuccessful adequate control of diastolic blood pressure in about 10% of patients, and systolic up to 40% of the treated patients (28,29).

In the Emergency Department patient-doctor relationship is not continuous, and the doctor usually does not know all aspects of the patient and cannot effectively treat the problem. The custom of patients to "cure" high blood pressure in large number of cases in the emergency medical services is very unfavourable in one hand for the patients themselves (treated temporarily), health care system (because of the burden of emergency service) and their family physician (poor continuity of care) (5). A large number of those cases could be probably prevented, and thus the health care system could be more efficient while patients and health workers would be more satisfied.

The limitation of this study is that it covered only one health centre and the results cannot be considered relevant for the national health system.

In conclusion, a better organization of the health service, patient education and better support of other social systems can contribute to a lesser number of professionally undesirable patient requests.

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