

Profile of the Romanian Hypertensive Patient Data from SEPHAR II Study

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Aim. The objective of this paper is to present the profile of the Romanian hypertensive patient as revealed by the analysis of hypertensive subjects from SEPHAR II survey.

Methods. A total number of 798 hypertensive subjects identified by SEPHAR II survey were analyzed in terms of socio-demographic characteristics, cardiovascular risk factors, subclinical target organ damage, established target organ disease, total CV risk and HT awareness, treatment and control. The profile of the Romanian hypertensive patients was built using the mod of every above mentioned target variables.

Results. The majority of hypertensive subjects were females (54.9%), mean age of 57.42 ± 13.38 years, coming from the South region (17.8%), living in urban areas (59.5%) and aware of their condition (69.5%), associating most often other 4 CV risk factors among which physical inactivity (67.3%), visceral obesity (60.4%) and hypercholesterolemia (61.3%) are the most prevalent, having therefore a very high added CV risk (60.3%). Despite the widespread use of at least 2 anti-hypertensive drugs (72.3%), an effective treatment was recorded only in a quarter of treated hypertensives.

Conclusion. The profile of Romanian Hypertensive patient is: middle aged female living in urban area of the South region of the country, with secondary education and a low average income, sedentary lifestyle, nonsmoker and aware of BP values, having visceral obesity, a high total cholesterol and LDL-cholesterol levels and normal HDL-cholesterol and triglyceride levels, having metabolic syndrome, nondiabetic and associating 4 other cardiovascular risk factors and therefore having a high added cardiovascular risk.

Key words: hypertension, total cardiovascular risk, profile, survey, national.

Cardiovascular disease (CVD) is the leading cause of death worldwide, with annual death rates estimated at 17.5 million in 2005 and projected to increase to approximately 20 million by 2015 [1]. CVD causes 47% of all deaths in Europe and 40% in the European Union, whereas in Romania CVD causes more than 62% of all deaths [2]. These alarming numbers require a more detailed evaluation of the problem.

Large potential to control the disease lies in developing effective preventive policies aiming to lower exposure to the classic CVD risk factors [3]. Identifying individuals at high risk of developing CVD but who are currently asymptomatic is one of the main goals of primary prevention. Interventions targeted at modifiable risk factors, such as hyper-

tension (HT), hypercholesterolemia, or smoking can delay or even prevent the occurrence of CVD [4–6].

At European level, prevalence of risk factors is studied intensively. Few adults in European countries participate in adequate levels of physical activity, with inactivity more common among women than men. Levels of obesity are high across Europe in both adults and children, although rates vary substantially between countries. The prevalence of diabetes in Europe is high and has increased rapidly over the last ten years, increasing by more than 50% in many countries [2].

In Romania, the lack of representative data regarding prevalence of arterial hypertension and other cardiovascular risk factors, led to the

initiation of the SEPHAR (abbreviation from the full title: **S**tudy for the **E**valuation of **P**revalence of **H**ypertension and **C**ardiovascular Risk in **R**omania) project. Consequently, in 2005 the first epidemiological study based on a representative sampling for the entire adult population of Romania, SEPHAR I, was carried out. Its results confirmed Romania as a high cardiovascular risk country [7–10].

In 2011 a second epidemiological study, SEPHAR II was initiated aiming for a more accurate estimation of prevalence of CV risk factors among Romania's adult population and their evolutionary trend during 2005–2012.

The objective of this paper is to present the profile of the Romanian hypertensive patient as revealed by the analysis of hypertensive subjects from SEPHAR II survey. Interventions targeted at patients that resemble this profile can delay or even prevent the occurrence of CVD, therefore contributing to the decrease in CV mortality in Romania.

MATERIALS AND METHODS SEPHAR METHODOLOGY

SEPHAR II is a national cross-sectional survey conducted on a representative sample for the Romanian adult population. The method used for sample selection – multi-stratified proportional sampling procedure and part of study design is the same from SEPHAR I, that has been published elsewhere [7–9]. Briefly, the survey encompasses 2 visits 7–10 days apart (the first one took place in the subject own home and the second took place in a general practitioner's (GP) office). After giving written informed consent all enrolled subjects they were evaluated by means of a 76 items questionnaire (encompassing sociodemographic, medical history and lifestyle data) and anthropometric measurements (waist, height, arm, hip and waist circumference) during the first visit.

Three consecutive blood pressure (BP) and heart rate (HR) measurements (at least 1 minute in between) after adjusting the cuff size to the arm circumference (standard cuff if arm's circumference is < 32cm and large cuff if the arm's circumference is > 32 cm) were performed according to the recommendations of the European Society of Hypertension (ESH): in seated position with their backs supported and after at least 5 minutes rest and more than 30 minute from smoking or drinking coffee [11][12] – during first and second visit. Eight to 14 hours fasting blood and urine samples for laboratory analysis (total serum cholesterol, serum

triglycerides, HDL-cholesterol; LDL-cholesterol, fasting plasma glucose, glycated hemoglobin, serum creatinine, serum uric acid, microalbuminuria, urinary creatinine) were collected during the second visit by central laboratory trained nurses. Also during the second visit each subject had a 12 lead ECG recording and arterial stiffness measurements (in the current paper are presented only aortic pulse wave velocity (PWVao) measurements – the gold standard of arterial stiffness measurements).

The study has been approved by the local ethics committee.

DEVICES USED IN THE STUDY

The anthropometric measurements were made using the following devices: weight – using an approved electronic scale – model Tanita HD 95 in SEPHAR II, with a maximum deviation of 0.1 kg, height – using a measuring device with a maximum deviation of 0.5 cm, waist circumference, hip circumference and arm circumference – using a tailor's measuring tool, with a maximum deviation of 0.5 cm.

Blood pressure and heart rate measurements were determined using an automatic oscillometric blood pressure (BP) measuring device – model A&D UA 95 Plus certified by Association for the Advancement of Medical Instrumentation (AAMI).

Measurements of arterial stiffness parameters were made with MedExpert Arteriograph (Tensio-Med, Hungary) and 12 leads ECG were recorded using a General Electric CardioSoft MAC600 1.02 device.

DEFINITIONS

Hypertension was defined as systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg at both study visits, using the arithmetic mean of the second and third BP measurement of each study visit (without taking into consideration the first BP measurement from each visit), or previously diagnosed HT under treatment during the last two weeks, regardless of BP values.

Awareness of HT was defined by the percent of hypertensive subjects who declared being previously diagnosed with HT by a medical professional.

Adequate BP control was defined as BP less than 140mmHg (for systolic) with 90 mmHg (for diastolic) in treated hypertensive patients [12].

Obesity was defined as BMI equal or greater than 30 kg/m² and visceral obesity by waist circumference more than 102 cm in men and more than 88 cm in women.

Smoking was defined as current smoking of at least one cigarette per day.

Sedentary lifestyle was defined as daily physical activity of less than 30 minutes.

History of premature CV disease was based on subject self-report.

Diabetes mellitus (DM) was defined as fasting plasma glucose (FPG) \geq 126 mg/dL, a glycated hemoglobin (HbA1c) \geq 6.5% or a previously diagnosis by a medical specialist on antidiabetic medication, regardless of FPG or HbA1c values [13].

Lipidic disorders were defined based on NCEP ATP III recommendations [14]: Hypertriglyceridemia was defined by a triglyceride (TG) serum level \geq 150mg/dL, hypercholesterolemia was defined by a total serum cholesterol (TC) level \geq 200 mg/dL, high levels of LDL-cholesterol \geq 130 mg/dL and low levels of HDL-cholesterol as \leq 40mg/dL for men and \leq 50mg/dL for women. The presence of elevated levels of both TG and TC and/or LDL-C and/or HDL-C was considered as **mixed dyslipidemia**.

Metabolic syndrome (MS) was defined by NCEP ATP III criteria as follows: at least 3 out of the following 5 criteria: waist circumference $>$ 88 cm in females or $>$ 102 cm in males, TG $>$ 150mg/dl or the use of lipid-lowering drugs, HDL-C $<$ 50 mg/dl in females or $<$ 40 mg/dl in males or the use of lipid-lowering drugs, SBP \geq 130 mmHg or DBP \geq 85 mmHg or current antihypertensive treatment, fasting plasma glucose $>$ 100 mg/dl or known DM under current treatment [14].

Subclinical target organ damage assessed in hypertensive subjects included: Left ventricular Hypertrophy (LVH) on ECG (Cornell product \geq 2440 mm \times msec), Microalbuminuria (urinary albumin to urinary creatinine ratio (UACR) of 30–300 mg/g), mild renal failure (by estimated glomerular filtration rate (eGFR) between 60–90 ml/min/1.72 m² using the Modification of Diet in Renal Disease (MDRD) formula) and arterial stiffness (by PWVao greater than 10 m/s)[12].

Established target organ damage has included total CV disease: Ischemic heart disease (based on subject self-report history of myocardial infarction, angina pectoris, myocardial revascularization procedure (PCI or CABG) and/or the presence of Q waves and /or ST/T abnormalities on ECG), atrial fibrillation (based on subject self-report history and /or the presence of AF on ECG), heart failure

history, peripheral artery disease and stroke (based on subject self-report) and total renal disease: moderate to severe renal failure (by estimated eGFR_{MDRD} $<$ 60 ml/min/1.72 m² and/or macroscopic proteinuria (UACR $>$ 300 mg/g).

Total CV risk was assessed using ESH/ESC risk stratification chart [11].

STATISTICAL ANALYSIS

Statistical analysis was performed with IBM SPSS Statistics 20.0 software at a significance level of $p \leq 0.05$ by a company specialized in research.

A descriptive analysis (modes, means, medians, standard deviations and range for continuous data and frequency analysis for categorical data) was performed for all the target variables.

Kolmogorov-Smirnov test was used to analyze continuous data distribution, according to which appropriate tests were further used in analysis: independent samples t-test or Mann-Whitney U test for differences between means of 2 independent groups, ANOVA or Kruskal-Wallis test for differences between means of 3 independent groups. Chi-square test was used to analyze differences between categorical data.

The profile of the Romanian hypertensive patients was built using the mods of each of the target variables: sex, age, area of residence, region, level of education, average income per person, marital status, medical insurance, smoking, physical inactivity, history of premature CV disease, obesity, diabetes, lipid profile, uric acid, subclinical target organ damage (LVH, microalbuminuria, mild renal impairment, PWVao), established target organ disease (ischemic heart disease, AF, heart failure, PAD, stroke, moderate-severe renal impairment, macroscopic proteinuria), total CV risk and HT awareness, treatment and control.

RESULTS

From the total 1975 enrolled subjects, presence of hypertension (HT) was recorded in 40.4% of cases (798 subjects) of which 28.1% (555 subjects) were known hypertensives.

Demographic and socioeconomic characteristics of hypertensive subjects

The majority of hypertensive subjects were females (438 subjects, 54.9%).

Mean age was 57.42 ± 13.38 years, ranging from 23 to 80 years, in majority aged between 40 and 60 years, the most frequently recorded age

being 52 years. Female hypertensives were older than males, in average with 7.1 years (females: 60.61 ± 12.74 years *vs* 53.53 ± 13.12 years, $p = 0.006$).

The highest proportion of hypertensive subjects was recorded in the South region while the lowest proportion was recorded in the West region (NE: 133 subjects, 16.7%, SE: 99 subjects, 12.4%, S: 142 subjects, 17.8%, SW: 87 subjects, 10.9%, W: 65 subjects, 8.1%, NW: 96 subjects, 12%, Center: 89 subjects, 11.2%, Bucharest: 87 subjects 10.9%; $p < 0.0001$).

The majority of hypertensive subjects live in urban areas (urban: 475 subjects, 59.5% *vs* rural: 323 subjects, 40.5%) with no sex differences.

Regarding the level of education, the majority of hypertensive subjects have secondary education (no education: 27 cases, 2.3%, primary education: 186 cases, 23.3%, secondary education: 445 cases, 55.8%, higher education: 138 cases, 17.3%, $p < 0.0001$), female hypertensives tending to have lower levels of education than males both in urban and rural areas.

The most frequently recorded marital status of our hypertensive subjects was married (568 subjects, 71.2%, widower: 150 subjects, 18.8%; single: 35 subjects, 4.4%, divorced: 44 subjects, 5.5%, $p < 0.0001$).

Only 283 hypertensive subjects (36%) are currently working while the majority of them (411 cases, 51.5%) are retired. The number of unemployed subjects was 58 (7.2%). Both in rural and in urban areas, females are more frequently retired than men who instead are more frequently working.

The average net income per person recorded in our subjects had a median value of 700 RON (approximately 160 EUR) ranging from 0 to 8472 RON, the most frequently average net income per person recorded was 1000 RON (approximately 200 EUR). Males have higher incomes than females only in urban areas (median values for rural areas – F: 480 RON *vs* M: 500 RON, $p = 0.921$; for urban areas – F: 800 RON *vs* M: 900 RON, $p = 0.016$).

Awareness of HT

Awareness of hypertension was recorded in 555 cases (69.5%), higher in females than in males only in rural areas (F: 129 cases, 70.1% *vs* M: 62 cases, 44.6%; $p < 0.0001$) and with no sex differences in urban areas (F: 202 cases, 79.5% *vs* M: 162 cases, 73.3%; $p = 0.110$), and increasing with age (< 40 years: 23 cases, 31.5% *vs* 40–60 years: 253 cases, 65.9% *vs* >60 years: 279 cases, 81.8%; $p < 0.0001$) both in females and males.

Cardiovascular risk factors among hypertensive subjects

Physical inactivity

The majority of our hypertensive subjects (536 subjects, 67.3%) have a sedentary lifestyle, females being more frequently physically inactive than males only in rural areas while in urban areas males and females are equally physically inactive (Table I).

Smoking

Current smoking was recorded only in 160 subjects (20.2%), the majority of the hypertensive subjects being nonsmokers (448 cases, 56.6%). Smoking was more prevalent among males both in rural and urban areas (Table I).

Family history of premature CV disease

History of premature CV disease was recorded only in 189 cases (24.1%), more frequently in females than in males only in urban areas and similar in both sexes in rural areas (Table I).

Obesity

Obesity defined by BMI > 30 kg/m² was recorded only in 335 cases (42.5%), without sex differences both in rural and urban areas.

While the majority of hypertensives were not obese by BMI values, visceral obesity, defined by waist circumference, was present in 482 cases representing 60.4% of them. Visceral obesity was more frequent in females than in males regardless of their area of residence (Table I).

Diabetes Mellitus

The prevalence of DM among hypertensive subjects was 19.4% (155 cases), the majority of them representing a previously diagnosed condition and only 4.9% (39 cases) of them being newly diagnosed during this study. DM prevalence was similar in males and females hypertensives both in rural and urban areas, and increased with age in both sexes (Table I).

Lipid disorders

The majority of our hypertensive subjects had hypercholesterolemia (present in 488 cases, 61.3% *vs* absent in 308 cases, 38.7%, $p > 0.0001$), high LDL-cholesterol levels (present in 460 cases, 57.6% *vs* absent in 336 cases, 42.1%, $p > 0.0001$), normal HDL-cholesterol levels (present in 532 cases, 66.7% *vs* absent in 264 cases, 33.1%, $p > 0.0001$) and normal triglyceride levels (present in 522 cases, 65.4% *vs* absent in 274 cases, 34.4%, $p > 0.0001$). The prevalence of Hypercholesterolemia, high LDL-cholesterol levels and low HDL-cholesterol levels were similar in males and females hypertensives, regardless of their place of living, while the prevalence of hypertriglyceridemia was higher in males than in females

hypertensives, both in rural and urban areas. Mixed dyslipidemia was recorded in 155 cases (32.7%) and was more frequent in males than in females hypertensives both in rural and urban areas (Table I).

Table I
CV risk factors in hypertensive subjects

Physical inactivity			
	Females	Males	p*
Rural	130 (71)	75 (54)	0.002
Urban	185 (73.1)	146 (66.1)	NSS
Smoking			
	Females	Males	
Rural	18 (9.9)	47 (34.1)	< 0.0001
Urban	34 (13.4)	61 (28)	< 0.0001
Obesity (BMI ≥ 30 kg/m ²)			
	Females	Males	
Rural	77 (42.1)	54 (39.1)	NSS
Urban	113 (45.4)	91 (41.6)	NSS
Visceral obesity (WC >102cm M and > 88 cm F)			
	Females	Males	
Rural	125 (68.3)	54 (39.1)	< 0.0001
Urban	188 (74)	115 (52.5)	< 0.0001
History of premature CVD			
	Females	Males	
Rural	42 (23.1)	35 (26.1)	NSS
Urban	69 (27.7)	43 (19.6)	0.041
DM			
	Females	Males	
Rural	25 (13.6)	22 (15.9)	NSS
Urban	57 (22.4)	51 (23.1)	NSS
Hypercholesterolemia			
	Females	Males	
Rural	122 (66.3)	96 (69.6)	NSS
Urban	153 (60.2)	117 (53.2)	NSS
High LDL-cholesterol			
	Females	Males	
Rural	116 (63)	80 (58)	NSS
Urban	142 (55.9)	122 (55.5)	NSS
Low HDL-cholesterol			
	Females	Males	
Rural	59 (32.1)	39 (28.3)	NSS
Urban	89 (35)	77 (35)	NSS
Hypertriglyceridemia			
	Females	Males	
Rural	51 (27.7)	59 (42.8)	0.005
Urban	74 (29.1)	90 (40.9)	0.007
Mixed dyslipidemia			
	Females	Males	
Rural	47 (25.5)	57 (41.3)	0.003
Urban	73 (28.7)	82 (37.3)	0.048
MS			
	Females	Males	
Rural	93 (50.8)	59 (43.1)	NSS
Urban	165 (65)	131 (60.1)	NSS

Values are presented as absolute number (percent); *chi square test; NSS: nonstatistical significance ($p > 0.05$); BMI: body mass index; DM: diabetes mellitus; WC: waist circumference; CVD: cardiovascular disease; LDL: low density lipoprotein; HDL: high density lipoprotein; M: males; F: females.

Metabolic syndrome

Metabolic syndrome was recorded in 448 hypertensive subjects (56.6%). The prevalence of MS was higher in urban than in rural areas and similar in both sexes regardless of their place of living (Table I).

Subclinical target organ damage

LVH on ECG was recorded only in 25 cases, representing 3.1% of total hypertensive subjects, and it was more frequently encountered in males than in females only in rural areas, while in urban ones the prevalence of LVH on ECG was similar in both sexes (Table II).

Arterial stiffness

Aortic PWV values recorded in hypertensives ranged between 5.4 m/s and 18.5 m/s, and had a mean value of 10.19 ± 2.22 m/s. PWVao values above the normal limit for age and BP were recorded in 227 cases representing 50.9% of the total PWVao measurements (446 subjects) although only 48.7% of them (217 cases) had PWVao equal or greater than 10m/s. Females had more frequently more rigid vessels than males only in rural areas, while in urban one there were no gender differences regarding arterial stiffness (Table II).

Microalbuminuria (UACR: 30–300 mg/g) was recorded only in a minority of cases – 57 subjects, 7.1%, the majority of hypertensives being without this type of subclinical target organ damage. There was no difference between male and female hypertensives regarding microalbuminuria their prevalence being similar both in rural and urban areas (Table II).

Mild renal impairment (eGFR_{MDRD}: 60–90 ml/min/m²) was present in 327 hypertensive subjects representing 41% of total, more prevalent in females than in males only in rural areas, while in urban ones, their prevalence was similar in both sexes (Table II).

In total, subclinical target organ damage (defined by the presence of at least one of the following: LVH on ECG, Microalbuminuria, mild renal impairment and elevated PWVao for age and BP) was recorded in 63.2% of all hypertensives, being more frequent in known hypertensives than in newly diagnosed ones, and more frequently in females than in male hypertensives only in rural area, while in urban ones the prevalence of subclinical target organ damage was similar in both sexes (Table II).

Table II
Subclinic target organ damage in hypertensive subjects

PWV _{ao} ≥ 10 m/s			
	Females	Males	p*
Rural	39 (47.6)	20 (27.4)	0.010
Urban	84 (55.3)	74 (53.2)	NSS
Microalbuminuria (UACR: 30–300 mg/g)			
	Females	Males	
Rural	18 (9.8)	6 (4.4)	NSS
Urban	18 (7.1)	15 (6.9)	NSS
Mild renal impairment (eGFR _{MDRD} : 60–90 ml/min/1.72 m ²)			
	Females	Males	
Rural	84 (45.7)	26 (18.8)	<0.0001
Urban	123 (48.4)	94 (42.7)	NSS
LVH on ECG			
	Females	Males	
Rural	1 (0.7)	11 (10.4)	<0.0001
Urban	4 (1.8)	9 (4.7)	NSS
Total subclinic TOD			
	kHT	ndHT	
	363 (65.6)	140 (57.6)	0.031
	Females	Males	
Rural	114 (62)	63 (45.7)	0.004
Urban	173 (68.1)	153 (69.5)	NSS

Values are presented as absolute number (percent); *chi square test; NSS: nonstatistical significance ($p > 0.05$); PWV_{ao}: aortic pulse wave velocity, UACR: urinary albumin to creatinine ratio; eGFR_{MDRD}: estimated glomerular filtration rate by Modification of Diet in Renal Disease formula; LVH: left ventricular hypertrophy; ECG: electrocardiogram; TOD: target organ damage; kHT: known hypertension; ndHT: newly diagnosed hypertension.

Established target organ damage

Total CV disease

Ischemic heart disease was recorded in 157 cases representing 19.7% of total hypertensive subjects, more frequently in females than in males only in rural areas while in urban ones the prevalence of ischemic heart disease was similar in both sexes (Table III).

Atrial fibrillation was recorded in 57 cases representing 2.9% of total hypertensive subjects, more frequently in females than in males only in urban areas while in rural ones the prevalence of AF was similar in both sexes (Table III).

Heart failure history was recorded in 70 cases representing 8.8% of total hypertensive subjects, its prevalence being similar in males and females hypertensives both in rural and in urban areas (Table III).

Peripheral artery disease was recorded in 23 cases representing 2.9% of total hypertensive

subjects, its prevalence being similar in males and females hypertensives both in rural and in urban areas (Table III).

Stroke history was recorded in 34 cases representing 4.3% of total hypertensive subjects, similar in males and in females in rural areas while in urban ones history of stroke was more frequent in males than in females hypertensives (Table III).

Total CV damage was recorded in 227 hypertensive subjects representing 28.5% of total, more frequently in females than in males only in rural areas while in urban ones its prevalence was similar in both sexes (Table III).

Moderate – severe renal impairment was recorded in 45 cases representing 5.6% of total hypertensive subjects, more frequently in females than in males only in rural areas while in urban ones the prevalence was similar in both sexes (Table III).

Macroscopic proteinuria was recorded in 11 cases, representing 1.4% of total hypertensive subjects, being more frequently in males than in females both in rural and urban areas.

Total renal damage (defined by the presence of eGFR_{MDRD} < 60 ml/min/m² and/or macroscopic proteinuria (UACR ≥ 300 mg/g)) was recorded in 51 cases representing 6.4% of total hypertensives, without significant differences between males and females both in rural and urban areas (Table III).

In total, **end organ damage** was recorded in 248 cases representing 31.1% of total hypertensive subjects, being more frequently in females than in males hypertensives only in rural areas while in urban ones the prevalence of end organ damage was similar in both sexes (Table III).

Total cardiovascular risk

The number of CV risk factors associated by our hypertensive subjects ranged between 1 and 6, in their majority associating 4 CV risk factors (that is beside HT).

According to the risk stratification chart recommended by ESH/ESC guidelines for HT the majority of our hypertensive subjects has high added CV risk (481 subjects, 60.3%) while less than 10% has low to moderate added CV risk. Sex differences in total CV risk were noticed only in rural areas where females have more frequently high and very high added CV risk, while in urban areas there is no difference in males and females hypertensives in added CV risk (Table IV).

Table III
Established target organ damage in hypertensive subjects

Ischemic heart disease			
	Females	Males	p*
Rural	41 (22.3)	14 (10.1)	0.004
Urban	59 (23.3)	43 (19.5)	NSS
Atrial fibrillation			
	Females	Males	
Rural	12 (6.6)	8 (5.2)	NSS
Urban	26 (10.4)	11 (5)	0.030
History of cardiac failure			
	Females	Males	
Rural	16 (9.2)	10 (7.5)	NSS
Urban	26 (10.6)	18 (8.5)	NSS
PAD			
	Females	Males	
Rural	2 (1.1)	3 (2.2)	NSS
Urban	9 (3.7)	9 (4.2)	NSS
Stroke history			
	Females	Males	
Rural	5 (2.9)	3 (2.2)	NSS
Urban	9 (3.7)	17 (8)	0.046
Total CV damage			
	Females	Males	
Rural	55 (29.9)	28 (20.1)	0.047
Urban	83 (25.7)	62 (28.1)	NSS
Moderate-severe renal impairment (eGFR _{MDRD} < 60 ml/min/1.72 m ²)			
	Females	Males	
Rural	11 (6)	2 (1.4)	0.041
Urban	17 (6.7)	15 (6.8)	NSS
Macroscopic proteinuria (UACR > 300 mg/g)			
	Females	Males	
Rural	0 (0)	3 (2.2)	0.044
Urban	1 (0.4)	7 (3.2)	0.019
Total renal damage			
	Females	Males	
Rural	11 (6)	4 (2.9)	NSS
Urban	17 (6.7)	19 (8.6)	NSS
Total established target organ damage			
	Females	Males	
Rural	59 (32.1)	30 (21.6)	0.037
Urban	85 (33.5)	74 (33.5)	NSS

Values are presented as absolute number (percent)*chi square test; NSS: nonstatistical significance (p > 0.05); CV: cardiovascular; PAD: peripheral artery disease; eGFR_{MDRD}: estimated glomerular filtration rate by Modification of Diet in Renal Disease formula; UACR: urinary albumin to creatinine ratio.

Table IV
Total CV risk of hypertensive subjects

Genders			
	Females	Males	p*
Low added CV risk			
• Rural	0 (0)	1 (0.7)	0.014
• Urban	3 (1.2)	3 (1.4)	NSS

Moderate added CV risk			
• Rural	15 (8.2)	11 (7.9)	0.014
• Urban	27 (10.6)	15 (6.8)	NSS
High added CV risk			
• Rural	96 (52.2)	94 (67.6)	0.014
• Urban	147 (57.9)	144 (65.2)	NSS
Very high added CV risk			
• Rural	73 (39.7)	33 (23.7)	0.014
• Urban	77 (30.3)	59 (26.7)	NSS

Values are presented as absolute number (percent)*chi square test; NSS: nonstatistical significance (p > 0.05); CV: cardiovascular.

Treatment and control of HT

The majority of hypertensive subjects were treated (472 cases, 59.1%), in their majority with 2 or more drugs (297 cases, 72.3%). Females were more frequently treated than males both in rural and in urban areas. The highest proportion of treated hypertensives (69 cases, 79.3%) was recorded in Bucharest region while the smallest one (37 cases, 42.5%) was recorded in SW region (Fig. 1). Treatment of hypertension was recorded more frequent in urban areas than rural ones only in NE, SE, SW and Bucharest region, while in the other 4 regions there was no significant difference between rural and urban regions. Both in males and in females, the proportion of treated cases was higher among medically insured hypertensives (Table V).

Table V
Treatment of hypertensive subjects

Genders			
	Females	Males	p*
• Rural	104 (56.5)	44 (31.7)	< 0,0001
• Urban	189 (74.4)	135 (61.1)	< 0,0001
Medical insurance			
	Insured	Uninsured	
• Females	252 (68.9)	3 (27.3)	0.004
• Males	155 (54.2)	1 (6.3)	< 0,0001
Area of residence			
	Rural	Urban	
• NE	25 (40.3)	52 (73.2)	< 0.0001
• SE	14 (33.3)	39 (68.4)	0.001
• S	43 (51.2)	34 (58.6)	NSS
• SW	10 (25.6)	27 (56.3)	0.004
• W	17 (63)	24 (63.2)	NSS
• NW	23 (54.8)	37 (68.5)	NSS
• Center	12 (63.2)	46 (65.7)	NSS
• Bucharest	4 (50)	65 (82.3)	0.032

Values are presented as absolute number (percent)*chi square test; NSS: nonstatistical significance (p > 0.05); NE: north-east region; SE: south east region; S: south region; SW: south-west region; W: west region; NW: north-west region.

Out of the 472 hypertensives under current antihypertensive treatment, control BP values were

recorded in only a quarter of them (118 subjects, 25%). There are significant differences regarding the therapeutic control rate between the 8 regions, Bucharest region having the highest control rate (27 cases, 39.1%) while SE region having the lowest one (6 cases, 11.3%) (Fig. 1). The therapeutic control

rate is significantly higher in urban areas than in rural ones and similar in males and females and in both medically insured and uninsured subjects. Also a significantly higher control rate was recorded among treated hypertensive subjects who adopt lifestyle changes (Table VI).

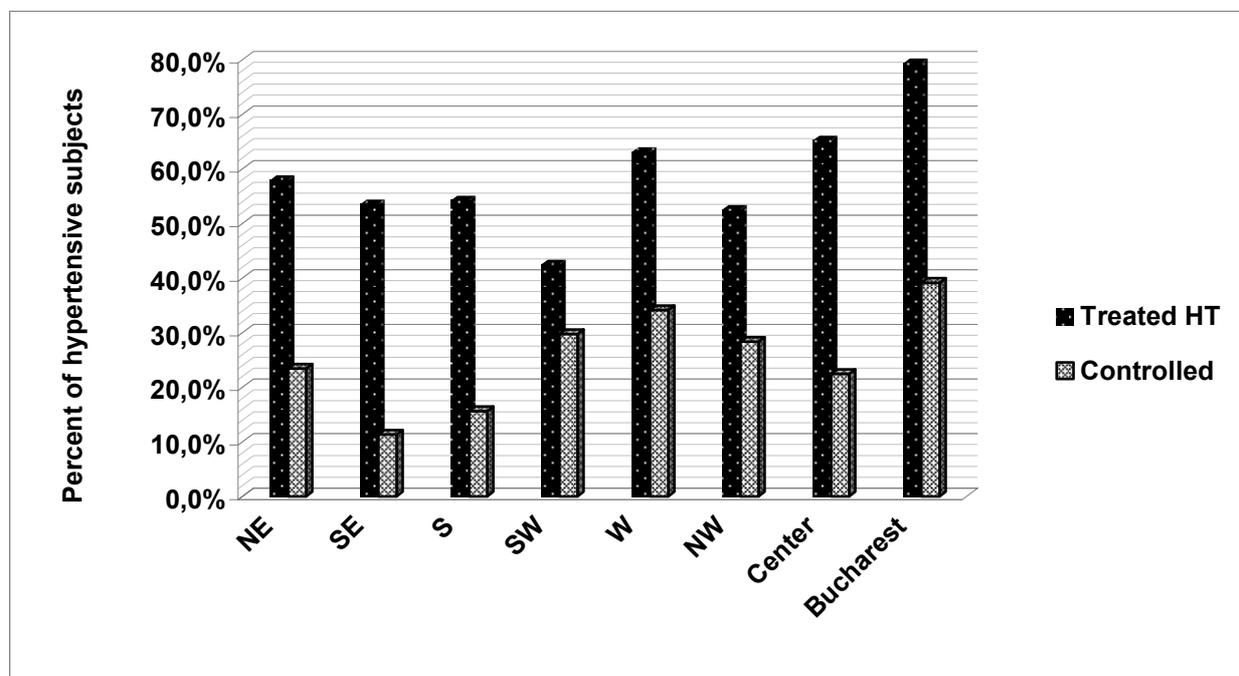


Fig. 1. Treatment and control of hypertensive subjects across regions.

Table VI
Blood pressure control in treated hypertensive subjects

Area of residence		
Rural	Urban	p*
21 (14.2)	97 (29.9)	< 0.0001
Gender		
Females	Males	
69 (23.5)	49 (27.4)	NSS
Medical Insurance		
Insured	Uninsured	
302 (74.2)	3 (75)	NSS
Lifestyle changes		
With	Without	
79 (28.3)	35 (19)	0.023

Values are presented as absolute number (percent)*chi square test; NSS: nonstatistical significance ($p > 0.05$).

The therapeutic control rate increased with the level of education, subjects with higher education having the double of the therapeutic control rate of subjects with low or without education (no education – 3 cases, 21.4%, primary education – 24 cases, 19.5% vs secondary education – 59 cases, 22.9% vs higher education – 32 cases, 41.6%, $p = 0.003$). The average income per person of hypertensive

subjects with controlled BP values is significantly higher compared to that of hypertensive subjects without treatment control of BP values (controlled – 980.6 ± 736.3 RON vs uncontrolled – 841.70 ± 754.4 RON, $z = -2.310$, $p = 0.021$).

DISCUSSION

Seven years ago, the most frequently encountered Romanian hypertensive patient was a middle aged man rather coming from the rural area of the South-West region of the country [10]. According to SEPHAR II survey's results the profile of the Romanian hypertensive patient has changed to one of a middle age female rather coming from the urban area of the south region of the country, profile that is similar to the ones from Poland, Croatia, Turkey and Spain [15–18].

Having a thorough assessment of both sub-clinical and clinical target organ damage, SEPHAR II survey offered a more complete profile of the Romanian hypertensive patient than SEPHAR I.

The Romanian hypertensive patient depicted from the results of our study is at high risk of fatal CV events secondary to a very high added CV risk resulted from associating to HT other CV risk factors (most often 4 CV risk factors) among which physical inactivity, abdominal obesity and hypercholesterolemia are the most prevalent. Compared with the situation from seven years ago, nowadays the Romanian hypertensive patient associates more frequently diabetes mellitus, hypercholesterolemia, high LDL-cholesterol levels, low HDL-cholesterol levels – risk factors for which the recorded prevalence among hypertensive subjects has doubled.

It is worth mentioning that while obesity defined by total body fat ($BMI \geq 30 \text{ kg/m}^2$) was present in a minority of hypertensive subjects, visceral obesity defined by waist circumference was found to be one of the main features of the Romanian hypertensive patient, result that confirms that visceral obesity has a much more profound impact on the pathogenesis of hypertension and its progression to organ damage than total body fat does.

More than half of hypertensive patients have at least subclinical target organ damage, most commonly in the form of increased arterial stiffness (PWVao above the normal reference limits set for age and BP values).

It is worth mentioning that the majority of newly diagnosed hypertensives (57.6%) have subclinical target organ damage as a mark of the duration of their disease, the “new” aspect of their disease is the diagnosis while its duration is most probably older.

The results of our study regarding treatment and control of HT does not support the “rule of halves” according to which only half of hypertensive subjects are aware of their condition, and of those who are aware only half are treated and of that half receiving treatment only half have control of BP values [19], more than half of hypertensive subjects (69.5%) were aware of their condition and among those who were aware treatment was recorded in more than half (85%) and BP control being recorded in only a quarter of treated hypertensive subjects (Fig. 2).

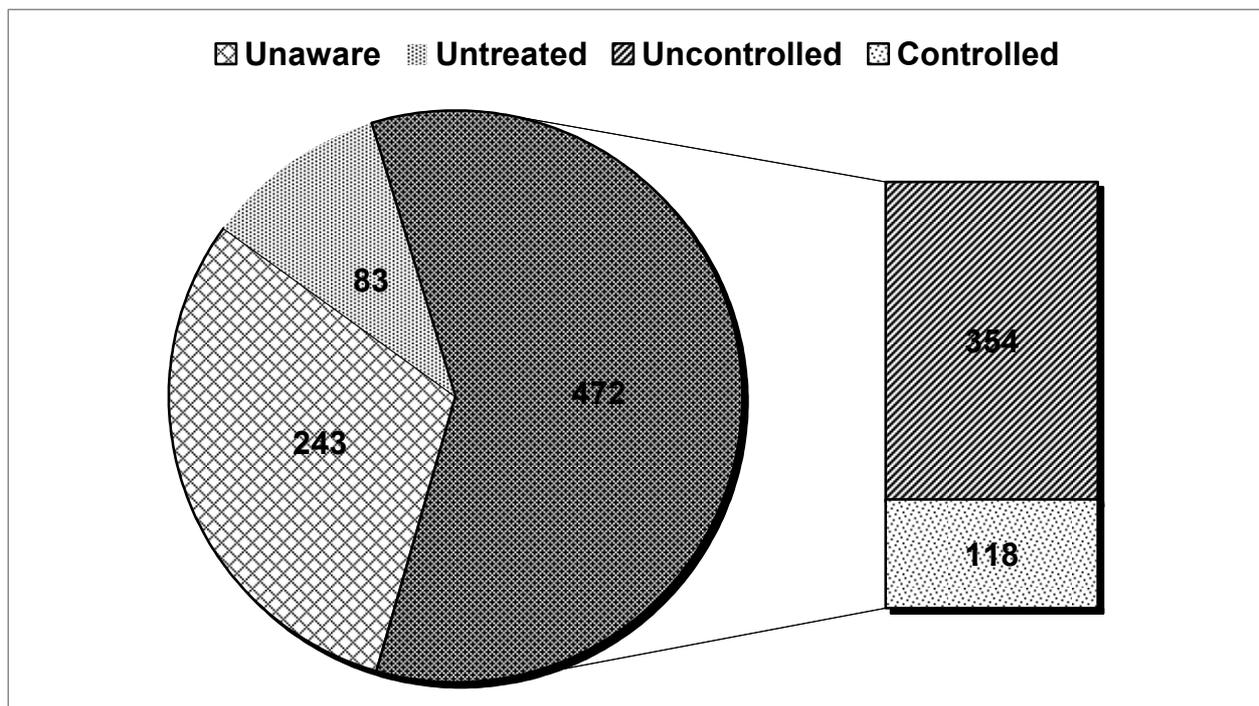


Fig. 2. Awareness, treatment and control of hypertensive subjects.

Despite the fact that hypertensive treatment was applied according to current guidelines (the use of at least 2 drugs in the majority of cases, and the use of drugs proved to have cardio protective effects such as ACEIs, ARBs or beta-blockers) only a quarter of treated patient achieve BP values $< 140/90 \text{ mmHg}$ – 118 subjects (25%).

A possible explanation for this may be an inadequate compliance caused by various factors such as the awareness of HT and the socio-economic barriers encountered by the adult Romanian population.

The results of our study revealed the socio-economic barriers encountered by the Romanian

hypertensive patient: low level of education, the lack of medical insurance and a low average income per person all leading to a lower therapeutic control rate together with the lack of lifestyle changes such as increase of quitting smoking, increasing physical activity, weight reduction, reduction of salt, alcohol and fatty food intake and increase in fruits and vegetables intake.

Treatment and control of hypertensive subjects from SEPHAR II are similar to those from BPCare study who enrolled hypertensive patients from Central and Eastern European countries (including Romania) and whose results showed that despite the widespread use of at least 2 antihypertensive drugs, an effective treatment was recorded in approximately a quarter of treated hypertensives and without significant differences among genders [20].

FUTURE RESEARCH DIRECTIONS

After the identification of the profile of the Romanian Hypertensive patient, SEPHAR II will continue with the follow-up process, annually by means of a simple questionnaire and with addition of laboratory workup at every 5 years, to see how this profile changes in time, and based on that trying to better orientate all the interventions aiming to improve CV mortality in Romania.

Since the improvement in the level of people's awareness of HT proved to lead to a better treatment and control of HT in Romania, developing national educational programs for HT, addressed

especially to the middle age hypertensive subjects, to those from rural areas, with low level of education, low average income and without medical insurance, continuing the national campaigns of BP measurements and distributing educative brochures to the population will result also in a better BP control and thus to a significant decrease in cardiovascular mortality in our country.

CONCLUSIONS

The profile of Romanian Hypertensive patient is: female sex, aged between 40 to 60 years rather coming from the South region of the country, living in an urban area, with secondary education and a monthly income of approximately 200 EUR, married, with a sedentary lifestyle, nonsmoker and aware of BP values but without effective treatment, with a normal total body fat level but having visceral obesity, nondiabetic, with a lipid profile of: high total cholesterol and LDL-cholesterol levels and normal HDL-cholesterol and triglycerides levels, having metabolic syndrome and often associating 4 other cardiovascular risk factors and therefore having a high added cardiovascular risk.

Increasing the level of education, the average income per person and improving the status of medical insurance as well as promoting lifestyle changes will help in overcoming the socio-economic barriers encountered by the Romanian hypertensive patient during the treatment of hypertension that will ultimately lead him to reach the optimal BP control.

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Scop. *Obiectivul acestei lucrări este de a creiona profilul hipertensiv român analizând lotul de subiecți hipertensivi din studiul SEPHAR II.*

Metode. *Un număr total de 798 subiecți hipertensivi indentificați în studiul SEPHAR II au fost analizați din punct de vedere al caracteristicilor socio-demografice, factorilor de risc cardiovascular, afectării subclinice și clinice de organe țintă, riscului cardiovascular total, gradului de conștientizare al hipertensiunii arteriale, tratamentului și controlului terapeutic al valorilor tensionale. Profilul pacientului hipertensiv român a fost construit cu ajutorul valorii mod a fiecărei variabile țintă anterior menționată.*

Rezultate. Majoritatea subiecților hipertensivi au fost de sex feminin (54,9%) având vârsta medie de $57,42 \pm 13,38$ ani, provenind din regiunea de Sud a României (17,8%) și mediul urban (59,5%) și care sunt conștienți de starea lor (69,5%), asociind de cele mai multe ori alți 4 factori de risc cardiovascular (sedentarismul – 67,3%, obezitatea viscerală – 60,4%, hipercolesterolemia – 61,3%). În ciuda utilizării pe scară largă a cel puțin 2 medicamente antihipertensive (72,3%), un tratament eficient a fost înregistrat doar la un sfert din pacienții hipertensivi tratați.

Concluzie. Profilul pacientului hipertensiv român este: sex feminin, vârstă mijlocie, provenind mai degrabă din regiunea de sud a țării și din mediul urban, cu un nivel mediu de educație și un venit mediu mai mic de 200 euro, sedentar, nefumător și fiind conștient de condiția sa de hipertensiv, dar fără control terapeutic, nediabetic, asociind sindrom metabolic, cu obezitate viscerală, dislipidemic și având un risc cardiovascular adăugat ridicat.

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APPENDIX 1

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