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SOME METABOLIC AND BEHAVIOURAL RISK FACTORS IN HYPERTENSIVE PATIENTS IN A CATCHMENT AREA OF IASI CITY

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Abstract. The present study is constituent part of a program which have started in 1997, aiming to assess the prevalence of physical, metabolic and behavioural risk factors related to primary hypertension in Iasi city. This cross-sectional survey was conducted in a primary care unit in Iasi city during 01.01 – 31.12.2001. The mean age of investigated persons was 58.38 ± 15.12 y for the Ist hypertension grade of severity, 64.12 ± 7.66 y for the IInd hypertension grade of severity, and 64.64 ± 9.73 y for the IIIrd grade of severity. No hypertension of IVth grade of severity (according to the Joint National Committee classification) was found in this catchments area. Body mass index (BMI) had average values between 26.05 ± 3.87 kg/m^2 and 29.51 ± 5.82 kg/m^2, indicating a moderate risk for cardiovascular disease. Hypertension was present in patients' family history in 41.93% in mothers and 13.97% in fathers, most of the patients were never smokers (93.46%). More than 24% of patients had a sedentary lifestyle. The total HDL-cholesterol ratio indicates a risk of coronary event, in 12.25% of male and 11.25% of female.

Key words: primary hypertensions, body mass index, HDL-cholesterol, LDL-cholesterol, cardiovascular disease, coronary event, family history

Rezumat. Prezentul studiu este o parte a unui program iniţiat în 1997, care şi-a propus să estimeze prevalenţa factorilor de risc fizici, metabolici şi comportamentali asociaţi hipertensiunii arteriale esenţiale, în municipiul Iaşi. Acest studiu transversal a fost efectuat la o unitate de asistenţă medicală primară în municipiul Iaşi, în perioada 01.01-31.12.2001. Vârsta medie a persoanelor investigate a fost de 58,38 ± 15,12 ani pentru HTA grad I; 64,12 ± 7,66 ani pentru HTA grad II şi 64,64 ± 9,73 ani pentru HTA grad III. Nu s-a identificat nici un caz de HTA grad IV (conform clasificării Joint National Committee). Indicele de masă corporală (IMC) a avut valori cuprinse între 26,05 ± 3,87 kg/m^2 şi 29,51 ± 8,82 kg/m^2, indicând un risc moderat de boală cardiovasculară. Pacienţii au avut un istoric familial de hipertensiune în proporţie de 41,93% la mame şi 13,97% la taţi, majoritatea pacienţilor nu au fumat niciodată (93,46%). Stilul de viaţă sedentar a fost prezent la peste 24% din pacienţi. Raportul colesterol total / LDH-colesterol a indicat riscul de eveniment coronarian la 12,25% din pacienţii de sex masculin şi 11,25% de sex feminin.

Cuvinte cheie: hipertensiune arterială esenţială, indice de masă corporală, LDH-colesterol, LDL-colesterol, boală cardiovasculară, eveniment coronarian, istoric familial

INTRODUCTION

The World Health Organization estimated that 7 million people die from cardiovascular diseases (CVD) every year in developing countries (1). Major risk factors for coronary artery diseases (CAD) such as smoking, high blood pressure, cholesterol are well known (2).

Subjects with established cardiovascular disease are at high risk. There is now objective evidence that an active risk factor management could prolong life.
Despite declining CVD mortality rates in many countries, CAD still constitutes a major burden on health resources (1).
As in Eastern Europe and developing countries the CVD mortality is rising at population level, a primary prevention strategy is necessary to reduce such rates.
In order to achieve this, the clinical targets are (3):

- no tobacco of any kind;
- total cholesterol < 5.0 mmol/l;
- blood LDL-cholesterol < 3.9 mmol/l;
- blood pressure < 140/90 mmHg;
- regular aerobic exercise of at least 20 to 30 min duration daily if possible but at least 4 times weekly;
- type 1 diabetes mellitus with fasting glucose 5.1-6.5 mmol/l (4).

Arterial hypertension is associated with an increased cardiovascular and cerebral morbidity (5). By lowering elevated blood pressure, stroke and to a lesser degree the coronary heart disease, morbidity and mortality are positively affected (5).
A linear correlation between diastolic blood pressure and the risk of suffering a fatal stroke or coronary heart diseases (CHD) was shown by Mac Mahon in a meta-analysis of the major epidemiologic studies (3). This suggest that the etiologic link between blood pressure and stroke is stronger than the association between blood pressure and CHD (5).
When analyzing data from three of the major placebo–controlled intervention trials in elderly patients, the Systolic Hypertension in the Elderly Program (SHEP), the Swedish Trial in Old Patients with Hypertension (STOP – Hypertension) and the Medical Research Council trial in adults (MRC) found that the main benefit was achieved by reducing stroke morbidity and mortality (5).
Surveys on socioeconomic inequalities show that cardiovascular risk factors and the prevalence rate have unequal repartition between different social-economic groups (5)
On the other site, the success of a program on social-economic inequalities in cardiovascular diseases depends on the capacity and will of Ministry of Health, nongovernmental organizations or community groups (5).
The contribution of blood pressure and other factors to cardiovascular disease risk is:

- among patients with mild hypertension, differences in the risks of CVD are determined not only by the level of blood pressure, but also by the presence or levels of other risk factors. For example, a man aged 65 years with diabetes mellitus and a blood pressure of 145/90 mmHg will have an annual risk of a major cardiovascular event that is more than 20 times grater than that a man aged 40 years with the same blood pressure, but without either diabetes or a history of CVD.
- in contrast, a man aged 40 years with a blood pressure of 170/105

mmHg will have a risk of a major cardiovascular event that is about 2-3 times greater than that of a man of the same age with a blood pressure of 145/90 mmHg and similar other risk factors levels;

- these differences in the absolute level of cardiovascular risk between patients with hypertension will often be determined to a grater extent by other risk factors than by the level of blood pressure (6).

The prevalence of coronary artery disease risk factors varies both between and within populations. This makes the necessity to study the prevalence of risk factors in different population groups even in a city.

SUBJECTS AND METHOD

The present study is constituent part of a program which started in 1997, aimed to assess the prevalence of physical, behavioural and metabolic risk factors related to primary hypertension. This cross-sectional survey was conducted in a primary medical care unit in Iasi city during 01.01 - 31.12.2001. The catchments area of this care unit is one of highest socioeconomic status (family income air pollution, educational attainment of inhabitants). The sample consisted of 93 hypertensive patients of both sexes, randomly selected.

Data were collected from the primary care unit disease register followed by an interview, complete physical examination and laboratory tests (serum total cholesterol, serum HDL-cholesterol, serum LDL-cholesterol, triglicerides, glicemia, creatinine).

Five modifiable risk factors have been considered: smoking status, obesity, alcohol drinking, physical inactivity, dyslipidemia and one unchangeable factor as family history.

Body mass index (BMI) had been also estimated. Details of the survey methodology have been published elsewhere (7).

RESULTS AND DISCUSSION

Table 1 presents the subjects participation rate by sex and age according to the severity of hypertension.

As table 1 shows, the mean age of the subjects was 58.38 ± 15.12 years for the Ist grade of severity, 64.12 ± 7.66 years for the IInd grade of severity and 64.64 ± 9.73.for the IIIrd grade of severity.

BMI had average values between 26.05 ± 3.87 and 29.51 ± 5.82 kg/m^2, indicating a moderate risk of CVD. No severe obesity among patients was found. The risk associated with obesity is likely to be due in part to blood pressure elevation, but reduced HDL-cholesterol and increased insulin and glucose may also be involved.

Table 1. The subjects participation rate by sex, age and hypertension level

Age (y)	Grade of severity of hypertension					
	I		II		III	
	M n (%)	F n (%)	M n (%)	F n (%)	M n (%)	F n (%)
<30	0	3 (3.23)	0	0	0	0
30-39	2 (2.15)	3 (3.23)	0	0	0	0
40-49	3 (3.23)	4 (4.30)	0	0	0	1 (1.08)
50-59	3 (3.23)	4 (4.30)	2 (2.15)	4 (4.30)	0	2 (2.15)
60-69	8 (8.60)	13 (13.98)	5 (5.38)	8 (8.6)	1 (1.08)	2 (2.15)
≥ 70	4 (4.30)	9 (9.68)	5 (5.38)	2 (2.15)	2 (2.15)	3 (3.23)
Mean ± SD	58.38 ± 15.12		64.12 ± 7.66		64.64 ± 9.73	

As patients declared, most of them are nonsmokers (17.2% of male and 32.25% of women I grade of severity, 15.05% of male and 16.12% of women of II grade of severity, 3.22% of male and 8.6% of women of III grade of severity) and only 2.15% of male and respectively women are occasional smokers. Among alcohol drinkers (14.9%, 5.37% and 3.22% are man of I, II and respectively III grade of HTA severity, and 11.82%, 4.3% are women of I and II HTA grade of severity.

More than 24% had a sedentary lifestyle and only 4.29% of man and 4.30 of women had practiced adequate physical activity (aerobic or medical gymnastics).

BMI had average values between 26.05 ± 3.87 and 29.51 ± 5.82 kg/m^2, indicating a moderate risk for cardiovascular diseases.

Tabel 2. The distribution of some behavioural risk factors, by sex (%)

Behavioural risk factors	Grade of severity of hypertension					
	I		II		III	
	M	F	M	F	M	F
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Smoking status						
Never smokers	16(17.2)	30(32.25)	14 (15.05)	15 (16.12)	3(3.22)	8(8.6)
Current smokers	0	2(2.15)	0	1(1.07)	0	0
Occasional smokers	2(2.15)	2(2.15)	0		0	0
Alcohol drinkers	12(12.90)	11(11.82)	5(5.37)	4(4.37)	3 (3.22)	0
Nondrinkers	3(3.22)		0		0	0
Physical activity						
Adequate	4(4.30)	11(11.83)	1(1.08)	0	1(1.08)	0
Inadequate	9(9.68)	18(19.34)	6(6.45)	10(10.75)	2(2.15)	3(3.23)
Sedentary	5(5.38)	8(8.60)	6(6.45)	5(5.38)	0	4(4.30)
mean ± SD / BMI kg/m^2	26.05 ± 3.87		29.27 ± 4.54		29.51 ± 5.82	
<20	0	3(3.23)	0	0	0	0
20-25	7(7.53)	18(19.35)	4(4.3)	3(3.23)	1(1.08)	2(2.15)
26-30	10(10.75)	11(11.83)	3(3.23)	7(7.53)	0	1(1.08)
31-35	3(3.23)	4(4.30)	4(4.30)	3(3.23)	2(2.15)	4(4.30)
36-39	0	0	1(1.08)	1(1.08)	0	2(2.15)

According to family history, 41.93% of patients had mother with hypertension and 13.97% father with hypertension. Diabetes mellitus was present in 20.43% in patients' family history.

Table 3. The distribution of some metabolic risk factors by sex and severity of hipertension

Metabolic risk factors (mmol/l)	Hypertension grade of severity					
	I		II		III	
	M	F	M	F	M	F
	n (%)	n (%)	N (%)	n (%)	n (%)	n (%)
mean ± SD / Serum cholesterol	6.10 ± 1.32		6.35 ± 0.86		6.00 ± 1.01	
< 5.17	8(8.6)	6(6.45)	1(1.08)	0	0	0
5.17-6.43	4(4.30)	16(16.13)	5(5.38)	9(9.68)	2(2.15)	7(7.53)
6.46-7.75	7(7.53)	10(10.75)	6(6.45)	3(3.23)	1(1.08)	0
>7.75	1(1.07)	5(5.38)	0	2(2.15)	1(1.08)	1(1.08)
mean ± SD / HDL-cholesterol	1.44 ± 0.19		1.39 ± 0.20		1.31 ± 0.47	
< 0.77	0	0	0	0	0	0
≥ 0.77	17(22.97)	30(40.54)	8(10.81)	11(14.86)	2(2.70)	6(8.10)
mean ± SD / LDL-cholesterol	3.95 ± 1.20		4.13 ± 0.66		4.13 ± 0.94	
< 2.58	2(2.70)	1(1.35)	0	0	0	0
2.58-3.85	5(6.75)	16(21.62)	1(1.35)	6(8.1)	1(1.35)	4(5.4)
3.87-4.88	6(8.10)	9(12.16)	4(4.30)	4(5.40)	-	4(5.4)
≥4.91	3(4.05)	5(6.75)	1(1.35)	1(1.35)	1(1.35)	1(1.35)
Total / HDL-chol ratio						
< 0.12	13(17.56)	26(35.13)	5(6.75)	7(9.45)	1(1.35)	5(6.75)
≥ 0.12	5(6.75)	4(5.40)	3(4.05)	3(4.5)	1(1.35)	1(1.35)
mean ± SD / Triglicerides	1.71 ± 0.49		1.89 ± 0.47		1.69 ± 0.46	
< 1.68	10(10.74)	18(19.34)	3(3.23)	7(7.53)	2(2.15)	4(4.30)
1.68-2.24	7(7.53)	8(8.6)	7(7.35)	5(5.38)	1(1.08)	5(5.37)
2.25-2.79	2(2.15)	2(2.15)	3(3.23)	2(2.15)	0	3(3.23)
≥ 2.80	1(1.08)	2(2.15)	0	1(1.08)	0	0
mean ± SD / Glicemia	4.44 ± 0.43		5.26 ± 1.69		4.82 ± 0.50	
< 6.10	19(20.43)	36(38.71)	10(10.75)	12(12.90)	3(3.23)	8(8.60)
6.10-8.82	1(1.08)	0	2(2.15)	1(1.08)	0	0
≥ 8.87	0	0	0	1(1.08)	0	0
mean ± SD / Creatinine	70 ± 10		78 ± 29		77 ± 26	
< 61	1 (1.07)	11(11.82)	0	2(2.15)	0	11(11.82)
61-97	15(16.12)	23(23.32)	8(8.6)	8(8.6)	3(3.22)	7(7.52)
> 97	1(1.07)	0	3(3.22)	1(1.07)	0	0

The prevalence of metabolic syndrome was studied. The values of total serum cholesterol between 250-300 mg/dl (6.46-7.75 mmol/l) were recorded mainly in women with hypertension I (10.75%) and 21.62% from women of the same level of hypertension had values of LDL-cholesterol between 100 and 149 mg/dl (2.58-3.85 mmol/l), as table 3 shows.

Values of total serum cholesterol higher than 300 mg/dl (7.75 mmol/l) were recorded in women (5.38%) in I grade of HTA severity.

In Framingham study, the subjects who developed a coronary event had values of total cholesterol of 244 mg/ml (6.30 mmol/l) and LDL-cholesterol was higher than 160 mg/dl (4.13 mmol/l) (2).

As table 3 shows, average values of HDL-chol were between 1.31 ± 0.47 and 1.44 ± 0.19 mmol/l.

Most of the patients (51.56%) had values of LDL-cholesterol higher than 160mg/dl (4.13 mmol/l).

According to total/HDL-cholesterol ratio, an efficient mean for estimating dyslipidemic risk of coronary disease at any level of LDL-cholesterol, 12.15% of man and 10.8% of women had values above 5 mg/dl (0.12 mmol/l), indicating a risk of a coronary event..

Serum trigliceride, had average values between 1.69 ± 0.46 and 1.89 ± 0.47 mmol/l. Hypertrigliceridemia was noticed in 17.22% of patients.

Values of trigliceride higher than 250 mg/dl (2.80 mmol/l) were registered only in 1.08% in women with hypertension I and II.

Values of glicemia between 110 and 160 mg/dl (6.10-8.82 mmol/l) were found in men with hypertension II (2.15%) and women with hypertension I and II (1.08%).

Mean values of creatinine showed normal renal function in all patients (70 ± 10 and 78 ± 29). Even if renal function tests in subjects with established hypertension do not have consistent results, they can show the influence of the kidney in the evolution of hypertension.

In general metabolic model of these patients does not show high risks for coronary events. The presence or absence of a family history of hypertension can be a measure of estimation of hypertension.

Also, important for these patients are values of BMI and as well as the physical activities.

CONCLUSIONS

1) This survey showed the prevalence of some metabolic and behavioural risk factors in hypertensive patients in a catchment's area of a primary care unit.

a) BMI had values between 26.05 ± 3.87 and 29.51 ± 5.82 kg/m^2 indicating a moderate risk for CVD. This increase in risk may, in part, be mediated by low HDL-cholesterol levels, high LDL and trigliceride levels and glucose intolerance,which characterize many subjects who are obese. Because of these associations, a professional advice is aimed at reducing BMI to 25 kg/m^2 or less by encouraging dietary caloric restriction and increased physical activity.

b) The total/HDLcholesterol ratio indicated a CAD risk for 12.15% of male and 10.70 of female.
c) A family history of hypertension was recorded in 41.93% of patients.
d) In the studied catchments area no hypertension of level IV (according to the JNC classification) was found. This suggest a good addressability to the health care.
e) More than 24% of patients had a sedentary lifestyle and only 4.29% of man and 4.30% of women had practical adequate physical activity (aerobic or medical gymnastic).
f) Most of the patients were never smokers (93.46%).

2) BMI, smoking status, physical activity are the main targets for intervention consisting in that people should be empowered through education and skill development to assume increasing responsibility for their own health behaviours.

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