

## INEQUALITIES IN HYPERTENSIVE PATIENTS FROM TWO CATCHMENT AREAS

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**Abstract.** The main objective of this survey was to evaluate if there are gender differences among patients diagnosed with primary hypertension. Two catchment areas in Iași city have been selected on socioeconomic status of inhabitants (higher status in A area; lower one in B area) and the hypertension cases randomly selected. The main outcome variable was the difference in the proportion of men and women with ischaemic heart disease (38.67% of men and 59.8% of woman in A area and 8.0% of men and 40.0% of woman in B area). Most of patients in both areas, which have been diagnosed by a specialist medical doctor with ischaemic heart disease, were women. The analysis of the behaviour related to smoking, showed a higher proportion of ischaemic heart disease among non-smokers, especially women ( $\chi^2=6.55$ ;  $p=0.08$  in A area and  $\chi^2=6.62$ ;  $p=0.08$  in B area). A significant difference between men and women under the age of 50 was evident ( $\chi^2=8.74$ ;  $p=0.03$ ). Women were also more likely having higher values of total cholesterol than men despite adjustment for age, obesity and smoking status (OR=0.56 men vs women).

**Key words:** inequalities, socioeconomic inequalities, primary hypertension, ischaemic heart disease

**Rezumat.** Subiectul principal al acestui studiu a fost de a determina diferențele între proporția de bărbați și femei diagnosticați cu hipertensiune arterială primară, în două unități de asistență medicală primară din municipiul Iași, considerate diferite din punct de vedere socio-economic (poluarea aerului, venitul familial, nivelul educațional). Principalul rezultat a fost diferența în proporția de bărbați și femei cu boală ischemică cardiacă (38,67% bărbați și 59,8% femei în zona A și 8,0% bărbați și 40,0% femei în zona B). Cei mai mulți dintre pacienții din ambele zone, diagnosticați cu cardiopatie ischemică de un medic specialist, au fost femei. Analiza comportamentului legat de fumat, a arătat o proporție mai mare a cardiopatiei ischemice printre nefumători, mai ales la femei ( $\chi^2=6,55$ ;  $p=0,08$  în zona A și  $\chi^2=6,62$ ;  $p=0,08$  în zona B). De asemenea, o diferență semnificativă statistic s-a găsit între femei și bărbați, sub vârsta de 50 ani ( $\chi^2=8,74$ ;  $p=0,03$ ). În general femeile au avut valori mai mari ale colesterolmiei chiar și după standardizarea în funcție de vârstă, obezitate și comportamentul legat de fumat (OR=0,56 bărbați vs femei).

**Cuvinte cheie:** inegalități, inegalități socioeconomice, hipertensiune arterială primară, boală ischemică cardiacă

### INTRODUCTION

Studied carried out in several western societies have shown that people in a low socioeconomic position suffer more from diseases and have a shorter

life expectancy than people in a higher socioeconomic position (1). It is important for health policy makers to understand socioeconomic differences in health. For example, it may show that

people of a particular socioeconomic group have certain lifestyle, so that some determinants of disease are more prevalent in this socioeconomic group (2).

Studies on differences in health as well as in disease may suggest potential interventions, with respect to these determinants, that can reduce the differences in health status between socioeconomic groups and improve the overall health of a population. In addition, studies on different population related to socioeconomic status may also enhance the understanding of disease etiology. A socioeconomic gradient has been observed for almost any disease, but this paper will focus only on differences in primary hypertension patients.

In several countries reported cardiovascular morbidity and mortality rates was inversely related to socioeconomic status (1).

The cardiovascular inequalities in population with different socioeconomic status bring in attention of the family doctor the atherosclerotic cardiovascular disease, the main aim being the identification of the patient who are at risk and who require an adequate treatment.

#### SUBJECTS AND METHOD

The study population was selected on two samples in two different catchments areas in Iasi city, which are considered to be socioeconomic different as air pollution, family income, educational attainment of inhabitants. The randomly selected samples from hypertensive patients

diagnosed, both sexes, were the following: 165 people from the catchments area with higher socioeconomic status (A area) and 70 people from the area with the lower status (B area).

The sample size was calculated using the following formula (3):

$$n = \frac{U\alpha^2 \delta x^2}{\Delta x^2 + \frac{U\alpha^2 \delta x^2}{N}}$$

n = sample size

$U\alpha$  = table value related to a 90% probability,  $\alpha=0.09$

$\delta x$  = variance

$\Delta x$  = upper admitted error

As formula shows the variance is used. In this case we used the variance of the phenomenon by age. The advantage of variance is that it can present in one numeric value the dispersion of the distribution of the frequencies.

Hypertension was classified according to Joint National Committee of USA (JNC) (4,5). This classification has the advantage of using quantitative criteria in defining hypertension. Patients receiving medical treatment during survey were considered hypertensive, also.

The main objective was to determine the differences in the proportion of men and women diagnosed with primary hypertension.

Details of the survey methodology have been published elsewhere (4,5).

## INEQUALITIES IN HYPERTENSIVE PATIENTS FROM TWO CATCHMENT AREAS

Obesity and overweight were classified using NHLBI (National Institute of Health National Heart, Blood Institute) gridelines BMI < 25; 25-29.9; > 30 kg/m<sup>2</sup> (6).

We aimed to determine the extent of sex inequalities in and between the catchement areas.

The following variables were used:

- comorbidity: heart ischaemic disease
- lifestyle: height, weight, BMI, smoking
- other risk factors for heart diseases: age, family history of HTA and/or diabetes mellitus, total serum cholesterol and its subfractions.

Logistic regression in order to determine the differences in the studied variables, standardization for the known cardiovascular risk factors (age, smoking, BMI>25 kg/m<sup>2</sup>) and multivariate analysis, were used.

### RESULTS AND DISCUSSION

The main outcome variable was the difference in the proportion of men and women with ischaemic heart disease.

In both areas, women diagnosed with ischaemic heart disease predominate: 58.9% (A) and 40.0% (B) (table 1).

**Table 1. Comorbidity in the catchements' areas by sexes**

Area	Ischaemic heart diseases (%)	
	Men	Women
A	38.7	58.9
B	8.0	40.0

Previous surveys showed that the gender distribution of hypertension was different (4,5). There were 62.3% hypertensive women in A area and 70% in B area. It is a difference in the proportion of men with ischaemic heart disease between A and B areas (38.7% respectively 8.0%) (table 1).

This situation can be due, either, to a better adressability / accesibility of population in the area to secondary care, or to the higher frequency of aged persons in A area. In B catchement area, there is, probably an underestimation of the real ischaemic heart disease cases because of lack of accessibility of patients to a specialized medical care.

The analysis of the behaviour related to smoking, revealed a higher proportion of ischaemic heart disease among non-smokers (table 2).

**Table 2. The prevalence of ischaemic heart disease among smokers and non-smokers by sexes (BMI > 25 kg/m<sup>2</sup>)**

Area	Men		Women		$\chi^2$	p
	Smokers No (%)	non-smokers No (%)	Smokers No (%)	non-smokers No (%)		
A	3 (1.8)	20 (12.1)	3 (1.8)	37 (22.4)	6.55	0.08
B	6 (8.5)	3 (4.2)	2 (2.8)	18 (25.7)	6.62	0.08
	$\chi^2=1.87$ ; p=0.1		$\chi^2=0.11$ ; p=0.7			

Among hypertensive patients with ischaemic heart disease, the proportion of women who do not smoke was higher (22.4% in A area and 25.7% in B area, respectively). The difference between women in both areas was not statistically significant ( $\chi^2=0.11$ ;  $p=0.7$ ). There was a difference between men and women in both areas ( $\chi^2=6.55$ ;  $p=0.08$  and  $\chi^2=6.62$ ;  $p=0.08$ , respectively).

Between the two areas, regardless of the smoking habit, the prevalence of ischaemic heart disease in men as well as in women showed no differences:  $\chi^2=1.87$ ;  $p=0.1$  and  $\chi^2=0.11$ ;  $p=0.7$ , respectively.

There was a significant difference between hypertensive men and women under the age of 50 ( $\chi^2=8.74$ ;  $p=0.03$ ) and no difference over this age ( $\chi^2=0.55$ ;  $p=0.9$ ). We have found also, a significant difference between women under the age of 50 regarding the ischaemic heart disease ( $\chi^2=16.0$ ;  $p=0.001$ ). Over 50 years, there was no statistical difference ( $\chi^2=6.51$ ;  $p=0.08$ ). In general, women are more likely to have ischaemic heart disease than man (7).

It is known from the literature that there is a continuous and strong relationship between hypertension and

ischaemic heart disease, but it not very clear what differentiate hypertensive patients who will have coronary events from those who will not have its. Conclusions depend on the duration of follow up study (8).

The table 2 shows a high prevalence of ischaemic heart disease among non-smokers women, but there was no significant difference between the two areas ( $\chi^2=0.11$ ;  $p=0.7$ ).

We have found higher values of total serum cholesterol among men, than women. This, suggest a difference between the values of total cholesterol and its subfraction between men and women.

A multivariate analysis was used in order to determine the associated factors to serum cholesterol values. For this analysis, higher values of 240 mg/dL (6.46 mmol/L) of total cholesterol were taken. The studied variables were: sex, diabetes mellitus, obesity, smoking (tables 3 and 4).

As table 3 shows, women from A area were also more likely to have higher values of total cholesterol, but obesity and smokers were more prevalent (OR=1.31; 90%CI 0.66-2.0 and OR=1.33; 90%CI 0.52-3.4).

**Table 3. Multivariate analysis to determine factors associated with total serum cholesterol > 240 mg/dL (6.46 mmol/L) in A area**

Variable	OR (90% CI)	p
men vs women	0.92 (0.50-1.71)	< 0.07
diabetes vs non-diabetes	0.59 (0.31-1.09)	0.07
obesity vs non-obesity	1.31 (0.66-2.00)	< 0.04
smokers vs non-smokers	1.33 (0.52-3.40)	0.05

## INEQUALITIES IN HYPERTENSIVE PATIENTS FROM TWO CATCHMENT AREAS

**Table 4. Multivariate analysis to determine factors associated with total serum cholesterol > 240 mg/dL (6.46 mmol/L) in B area**

Variable	OR (90% CI)	p
men vs women	0.56 (0.13-2.33)	0.07
diabetes vs non-diabetes	1.83 (0.36-5.21)	0.04
obesity vs non-obesity	0.25 (0.05-1.14)	0.03
smokers vs non-smokers	2.18 (0.32-4.52)	0.03

Table 4 shows women with higher total cholesterol values, despite adjustment for age, obesity and smoking status (OR=0.56; 90%CI 0.13-2.33). Diabetes and smokers were more prevalent.

### CONCLUSIONS

- Ischaemic heart disease had a higher prevalence among women in both areas.
- Regardless of socioeconomic status in both areas, the differences between sexes with ischaemic heart disease, seems related to smoking habit.
- Multivariate analysis using as independent variable total cholesterol level shows higher values for women.

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