ORIGINAL ARTICLE

Journal of Pre-Clinical and Clinical Research, 2009, Vol 3, No 2, 099-102
www.jpccr.eu

Occurrence of arterial hypertension among adult population in eastern Poland

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Abstract: The objective of the study was evaluation of the frequency of occurrence of arterial hypertension among the adult population in the Lublin Region of eastern Poland, and the relationship between the occurrence of arterial hypertension and age, gender, place of residence, and occupation performed. The study covered a random sample of 3,876 inhabitants: 2,386 females and 1,490 males, mean age 51.6. Arterial hypertension was diagnosed in 39.42% of the total number of the population examined. Arterial hypertension was more frequently observed in females (41.70%) than among males (35.77%). The number of people with arterial hypertension increased with age. Arterial hypertension was more frequently noted among farmers, compared to those who performed non-agricultural occupations. No statistically significant relationship was observed between the occurrence of arterial hypertension and the place of residence of the population examined.

Key words: arterial hypertension, age, gender, occupation, place of residence

INTRODUCTION

The results of a comprehensive observational study unequivocally indicate hypertension as one of the most important risk factors for cardiovascular diseases: ischemic heart disease, heart failure and stroke, which are the leading causes of deaths and morbidity throughout Europe and the USA [1, 2]. According to the WHO, there are 600 million people with arterial hypertension worldwide, which is responsible for approximately 6% of the total number of deaths [3]. A relationship was confirmed between the occurrence of arterial hypertension by age and gender. To-date in Poland, few comprehensive studies have been conducted concerning the prevalence of arterial hypertension among the rural population.

Objective. The objective of the study was evaluation of the frequency of occurrence of arterial hypertension among the adult population in the Lublin Region, and the relationship between age, gender, place of residence, and occupation performed.

MATERIAL AND METHODS

Selection of the patients for the study of hypertension

The study was conducted during the period April-June 2006, by the method of two-stage sampling. Based on patients' lists in 52 randomly selected primary health care units located in the Lublin Region, a group of patients aged over 18 was selected, which covered 2% of the adult population provided with care by an individual unit. The patients expressed their consent to participate in the study and were invited to the primary health care units where trained staff performed the measurement of arterial hypertension, and collected socio-economic information.

Measurement of the arterial hypertension

The study covered 4,004 people. Arterial hypertension was diagnosed in patients who had previously diagnosed arterial hypertension and/or had taken anti-hypertensive drugs, as well as among patients in whom the average value of 2 measurements performed during one visit was equal or higher than 180 mmHg for systolic pressure, and equal or higher than 110 mmHg for diastolic pressure.

Lack of arterial hypertension was diagnosed in patients with pressure values lower than 140 mmHg for systolic pressure, and lower than 90 mmHg for diastolic pressure, with no hypertension previously recognized, and who did not take antihypertensive drugs.

The patients in the study with pressure values ranging from 140-179 mmHg for systolic pressure and 90-109 mmHg for diastolic pressure were invited later to PHC units for repeat pressure measurement. Those in whom the repeated pressure measurements showed normal values were qualified as patients without hypertension, whereas those in whom during the subsequent measurement pressure values differed from normal were qualified as patients with hypertension. 28 patients reported for the repeated evaluation. Ultimately, the data obtained from 3,876 patients were classified for statistical analysis.

Statistics

Statistical analysis of the data was performed by means of Statistica 8.0 package. The discrete variables were compared in cross-tabulations with the use of Pearson's chi-square test. The continuous variables in the groups were examined by means of analysis of variance (ANOVA). Regression analysis was used for investigation of the relationship between age and hypertension.

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Received: 6 December 2009; accepted: 30 December 2009

RESULTS

The study covered 3,876 inhabitants of the Lublin Region: 2,386 females (61.56%), and 1,490 males (38.44%), mean age 51.6. The mean age of females in the study (52.5) was higher than that of males (50). The study covered 2,193 rural and 1,683 urban inhabitants. The mean age of the rural inhabitants (51,57) was higher than that of the urban population (50,59). The mean age of rural males was slightly higher (50.05) than that of urban males (49.93). The mean age of rural females was slightly higher (52.52), compared to urban females (51.20). 2,480 people performing non-agricultural occupations, and 1,075 farmers participated in the study. The mean age of the farmers examined was clearly higher (56.09), compared to people who performed non-agricultural occupations (50.32).

Table 1 The occurrence of arterial hypertension according to gender and place of residence.

Place of residence	Gender	Number %	Without arterial hyper-tension	Arterial hyper-tension	Total
Rural	M	N	549	290	839
chi2-15.32850,		%	65.44	34.56	38.26
df=1,	F	N	772	582	1354
p=0.00009		%	57.02	42.98	61.74
	Total	N	1321	872	2193
		%	60.24	39.76	100.00
Urban	M	N	408	243	651
chi2-1.216416,		%	62.67	37.33	38.68
df=1,	F	N	619	413	1032
p=0.27007		%	59.98	40.02	61.32
	Total	N	1027	656	1683
		%	61.02	38.98	100.00
Total	M	N	957	533	1490
ch2-13.50505,		%	64.23	35.77	38.44
df=1,	F	N	1391	995	2386
p=0.00024		%	58.30	41.70	61.56
	Total	N	2348	1528	3876
		%	60.58	39.42	100.00

Arterial hypertension was diagnosed in 39.42% of the total number of the population examined, with a similar frequency among the rural as urban inhabitants – 39.76% and 38.98%, respectively.

Arterial hypertension was significantly more often noted among females (41.70%) than in males (35.77%). The difference between the percentage of females with hypertension and that of males with hypertension was more clearly observed among rural inhabitants (42.98% and 34.56%), compared to the urban population (40.02% and 37.33%). Arterial hypertension was more frequently diagnosed among rural than urban females, whereas it was more often observed in urban than rural males (Table 2).

The percentage of patients with hypertension significantly increased with age, both among males and females. In patients aged 50 and under, arterial hypertension was more frequent in males. An especially big difference was observed among the youngest population (aged 18-30), where arterial hypertension was diagnosed over 2.5 times more often among males than in females (5.44 vs. 2.19%). Among the population in the study aged 31-40, arterial hypertension occurred more often in males; however, the difference was not so clear (11.66 vs. 9.57%). A similar situation was noted among people aged 41-50 (26.95 vs.23.99%). In those aged over 50, arterial hypertension was more frequent among females. Already in the age group 51-60 this difference was clear (females – 52.70%, males – 47.48%), then continued to increase in the group aged 61-70 (72.56% vs. 64.06%), and was especially apparent in the oldest age group (over 70), where hypertension was diagnosed in 81.66% of females and 67.02% of males.

The prevalence of hypertension according to age was investigated by simple linear regression analysis. At age interval 30-85, a positive relationship was observed between the frequency of occurrence of hypertension and age, both among males and females.

Table 2 Occurrence of arterial hypertension according to age and gender (SS=325546.3, df=3, p=0.00000).

Age	Gender	Number %	Without arterial hyper-tension	Arterial hyper-tension	Total
18-30	M	N	226	13	239
		%	94.56	5.44	6.17
	F	N	313	7	320
		%	97.81	2.19	8.26
31-40	M	N	197	26	223
		%	88.34	11.66	5.75
	F	N	293	31	324
		%	90.43	9.57	8.36
41-50	M	N	225	83	308
		%	73.05	26.95	7.95
	F	N	377	119	496
		%	76.01	23.99	12.80
51-60	M	N	177	160	337
		%	52.52	47.48	8.69
	F	N	245	273	518
		%	47.30	52.70	13.36
61-70	M	N	69	123	192
		%	35.94	64.06	4.95
	F	N	87	230	317
		%	27.44	72.56	8.18
>70	M	N	63	128	191
		%	32.98	67.02	4.93
	F	N	76	335	411
		%	18.34	81.66	10.60
Total	M	N	957	533	1490
		%	64.23	35.77	38.44
	F	N	1391	995	2386
		%	58.30	41.70	61.56
TOTAL	N		2348	1528	3876
	%		60.58	39.42	100.00

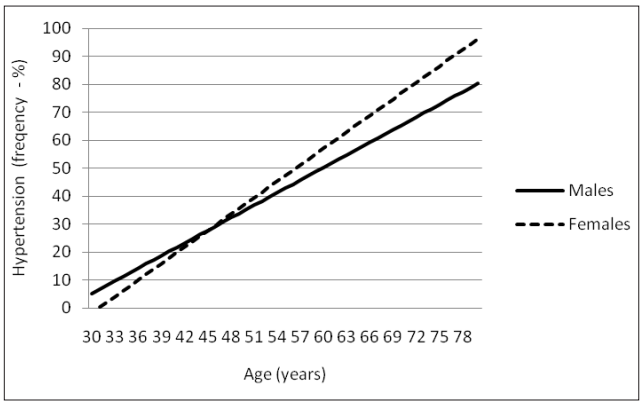

Figure 1 Regression lines for frequency of occurrence of hypertension at age interval 30-80 among males and females.

% males with arterial hypertension= -0.3972 + 0,015 × age
% females with arterial hypertension= -0.6047 + 0,0196 × age

Based on the regression analysis it was found that at the age of 44, the percentage of females with arterial hypertension diagnosed was higher than that of males.

Table 3 Occurrence of arterial hypertension according to occupation performed. (ch2 – 18.40206, df=5, p=0.00248).

Occupation	Number %	Without arterial hyper-tension	Arterial hyper-tension	Total
Non- farmer	N	1559	921	2480
	%	62.86	37.14	69.76
Farmer	N	554	521	1075
	%	51.53	48.47	30.24
Total	N	2113	1442	3555
	%	59.44	40.56	100.00

Arterial hypertension was considerably more often diagnosed among farmers (48.47%), compared to non-farmers (37.14%). Also, among the rural population examined arterial hypertension occurred considerably more frequently in framers (48.54%), compared to non-farmers (34.25%).

DISCUSSION

Comparison of the results obtained concerning the prevalence of arterial hypertension with the results of studies previously conducted in Poland encounter great difficulties associated with methodological differences and different diagnostic criteria. In the 2002 NATPOL III PLUS population study, arterial hypertension was diagnosed in 29% of the population examined aged over 18 [4]. In another multi-centre epidemiological study conducted in the same year under the name PENT among the population aged over 18, arterial hypertension was diagnosed in 44.2% of the people examined [5]. The most up-to-date data come from the WOBASZ project (2003-2005) which covered a population aged 20-74, where the presence of arterial hypertension was noted in 36% of respondents [6].

The frequency of occurrence of arterial hypertension observed in our study (39.42%) was higher than that noted in the WOBASZ project, and clearly higher than in the NATPOL II PLUS study. On the other hand, however, the frequency of occurrence of hypertension in the presented study was clearly lower than in the PENT study. It was also lower in earlier studies, the POL MONIKA study of 1993, where arterial hypertension was diagnosed in 41% of Warsaw inhabitants on the right bank of the river, and 44% of the population in the Tarnobrzeg Region, and the NATPOL II project (1997), where hypertension was confirmed in 44% of the total population examined [7, 8].

The majority of Polish studies of the population aged over 18 indicated a more frequent occurrence of hypertension among males than females. In the NATPOL II project (1997), arterial hypertension was diagnosed in 48% of males and 41% of females, in the PENT study (2002) – in 45% of males and 44% of females, and in the WOBASZ study – in 42% of males and 33% of females (5, 6, 8). Only in the NATPOL III PLUS project (2002) the frequency of diagnosing hypertension was the same among males and females, and reached 29% (4). Reports from other European countries, Canada and the USA, also indicate more frequent occurrence of arterial hypertension among males. At the end of the 90s, arterial hypertension was more often diagnosed among males than females in Italy (45% vs. 31%), Sweden (45% vs. 32%), United Kingdom (47% vs. 37%), Spain (49% vs. 45%), Finland (56% vs. 42%), Germany (60% vs. 50%), United States (30% vs. 26%), and Canada (31% vs. 24%). A similar situation was observed by researchers in Czechoslovakia and Latvia [10, 11].

The results obtained in the presented study clearly differ from the above-mentioned reports; this is because in our study a considerably more frequent occurrence of arterial hypertension was noted in females (41.70%), compared to males (35.77%). It seems that this difference is too large to be explained merely the mean age of females being higher by 2 years. The results obtained in the presented study indicate rather an upward tendency in the frequency of arterial hypertension among females associated with the progressing feminisation of old age, which was anticipated by some researchers [12]. All-Polish studies show a greater prevalence of arterial hypertension in the younger groups – among males, whereas in the older age groups – among females. Polish authors and researchers from other countries associate an increase in arterial hypertension among older females with the effect of menopause [13, 14, 15]. In the NATPOL III PLUS project, the prevalence of arterial hypertension in the younger age group was 7.2% (males – 11% vs. females – 3.4%), in the age group 40-59 – 34.1% (males – 34% vs. females 34.1%), while among the population aged over 59 – 57.5% (males – 54% vs. females – 59.9%) [16]. In the PENT study, the prevalence of hypertension increased with age – in males from 13-64%, and females from 3-74%. In people aged over 55, the percentages concerning hypertension were higher among females, while under this age – in males [5]. In the WOBASZ study, the borderline age where arterial hypertension was more frequent in females was 54. In this study, among the population aged 20-34, hypertension was diagnosed in 15% of males and 2% of females, in the age group 35-44 – in 25% of males and 9% of females, while in the group aged 45-54 – in 40% of males and 27% of females. In the age group 55-64, the frequency of hypertension was the same for both genders – 50%. In the oldest age group - 65-74, hypertension was slightly more often noted in females – 58%, compared to males – 56% [6]. The results obtained in the presented study also show a greater prevalence of hypertension

among males in the younger age groups, especially among the youngest population examined [18-30], where the frequency of hypertension in males was 2.5 times higher than in females. It is noteworthy that the frequency of arterial hypertension among males in this age group was clearly lower than that described in other reports. A greater prevalence of arterial hypertension among males was also observed in the age groups 31-40 and 41-50; the difference, however, being considerably smaller than that reported in other studies, i.e. 2-3%. In the presented study, already at the age of 44, the percentage of females was higher than that of males. Among the population aged 51-60, a clear, i.e. by 5% prevalence was already noted in the occurrence of hypertension in females. This difference increased with age, and was over 8% among the population aged 61-70, and over 15% – at the age of over 70. In the people examined aged over 70, arterial hypertension was diagnosed in 67.2% of males and among as many as 81.66% of females. The results obtained in the presented study, on the one hand, may result from the research method adopted, which practically allowed the elimination of the so-called 'white-kit syndrome', and on the other hand, may indicate a decrease in the age at which arterial hypertension develops in females.

In Polish studies, there are few comparisons concerning the prevalence of arterial hypertension among the rural and urban populations. Only analyses of the subgroups in the POL MONIKA study, covering the population aged 45-64, showed that arterial hypertension is more frequent among females in both the rural and urban areas [13]. In the presented study, no significant differences were found between the prevalence of hypertension in rural and urban areas – 39.76% and 38.98%, respectively. Both in rural and urban areas, arterial hypertension occurred more frequently in females than males, the difference being more clearly defined among the rural inhabitants. Hypertension occurred more often in urban than rural males, while it was more frequent in rural than urban females.

The considerably more frequent occurrence of hypertension among farmers than non-farmers may be explained by the significantly higher mean age of farmers.

CONCLUSIONS

1. The results obtained show a high prevalence of arterial hypertension among the adult population in the Lublin Region, both in males and females.
2. The higher prevalence of arterial hypertension among females is probably due to the progressing feminisation of old age. It may also result from the decrease in the age of females developing arterial hypertension.
3. No statistically significant differences were noted in the occurrence of arterial hypertension among rural and urban population.

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