

# Knowledge about arterial hypertension in the Polish population: the WOBASZ study

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## Abstract

**Background:** Insufficient knowledge on cardiovascular disease (CVD) risk factors and unawareness of CVD and their complications limit effectiveness of CVD prevention. Thus, monitoring knowledge regarding health issues is necessary in order to prepare prevention projects.

**Aim:** To evaluate knowledge on hypertension (HT) in relation to gender, age, education level, personal HT status, and a family history of death due to CVD.

**Methods:** A representative sample of the Polish population including 6977 men and 7792 women aged 20–74 years was studied in the WOBASZ study in 2003–2005. Data were collected using a questionnaire. We analysed how many respondents knew their blood pressure (BP) and classified it correctly, knew the upper limit of normal BP values (BPlim), and complications of untreated HT. Statistical analysis was performed using the  $\chi^2$  test.

**Results:** Overall, 51% of men and 56% of women reported they knew BPlim ( $p < 0.0001$ ), but about 50% of them identified it within the normotensive range, 40% reported it at the level corresponding to stage I HT, and 8% of men and 6% of women even reported it as  $> 160/100$  mm Hg. Fifty-nine percent of men and 69% women ( $p < 0.0001$ ) reported being aware of their own BP, but only 72% of these men and 80% of these women classified it correctly. The most often mentioned HT complications were stroke (58% men and 69% women,  $p < 0.01$ ) and myocardial infarction (60% and 65%, respectively,  $p < 0.01$ ), and 32% of men and 23% of women did not know any complications of HT ( $p < 0.01$ ). Older, more educated persons and those with HT or family history of death to CVD had greater knowledge on HT.

**Conclusions:** Knowledge concerning HT is still insufficient in the Polish population, with women being more knowledgeable than men. Age, education level, HT status, and a family history of death due to CVD were significant independent predictors of knowledge level.

**Key words:** hypertension, knowledge, national survey

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## INTRODUCTION

Cardiovascular disease (CVD) is the major health problem in the Polish population, and in the 1980s, mortality due to CVD in Poland was highest in Europe [1]. Since early 1990s, it started to decrease and has now fallen below the European mean, although it still higher than mortality due to CVD in the Western European countries. Arterial hypertension (HT), a risk factor for CVD and the cause of approximately 6% of all deaths among adults worldwide, is present in about one in three adults

in Poland [2, 3]. The Central Statistical Office of Poland (GUS) data indicate that in 2010, HT was the cause of death of 1713 men and 2385 women aged  $\geq 20$  years, which translated to 3.15% of deaths due to CVD and 1.30% of all deaths in men (in women 3.85% and 2.01%, respectively). A WHO report of 2009 indicated that about 12.8% of all CVD deaths worldwide and 26% of CVD deaths in Europe may be attributed to HT [4]. Of concern, HT remains undiagnosed, untreated or uncontrolled in a large proportion of subjects with high BP [3].

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A low societal level of knowledge regarding issues related to high BP may result in worse HT control and increased incidence of CVD. Knowledge on health issues and awareness of individual CVD risk depend on many factors including gender, age, education level, socioeconomic status, overall health status, and access to medical information (obtained from physicians, through radio, television, pamphlets, etc.). Literature data indicate a high need of health education, especially targeted at high-risk groups [5]. Schneider et al. [6] studied knowledge on risk factors of stroke and found that subjects at the highest risk were the least knowledgeable regarding stroke symptoms and risk factors. It is known that education programs encourage patients to participate actively in the management process [7]. A representative survey performed in Poland in 1997 indicated that 41% of respondents did not know their BP level [8]. Another study to evaluate major risk factors in Polish parliament members showed that 28% of them were not aware of their BP values [9].

In the Polish literature, few studies evaluated broad societal knowledge regarding issues related to high BP in such a large population as the WOBASZ study (a multicentre Polish population health status survey — Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia Ludności). Goals of the WOBASZ study have been described previously [10].

The aim of the present study was to evaluate knowledge on HT in the Polish population in relation to gender, age, education level, personal HT status, and a family history of death due to stroke or myocardial infarction (MI).

## METHODS

### Study population

We studied a random sample of the Polish population in the age range of 20 to 74 years. Randomisation was two-stage, stratified for voivodeship and the commune (gmina) size. In all 16 voivodeships, we randomly selected 2 small communes, 2 medium-sized communes, and 2 large communes, and than 100 men and 100 women in each of the communes (overall 19,200 subjects). Ultimately, the actual number of the evaluated subjects was 13,545. Response rate after excluding subjects unavailable for evaluation (death or changed address of residence) was 74% among men and 79% among women. The methods used in the WOBASZ study, performed by the Institute of Cardiology in collaboration with the Medical University of Gdańsk, the Medical University of Łódź, Poznań University of Medical Sciences, the Medical University of Silesia in Katowice, and the Jagiellonian University in Cracow, have been described previously [11].

### Evaluation of knowledge on hypertension

Knowledge on HT was evaluated based on the answers to specific items in the questionnaire. We analysed the following elements of knowledge:

1. Knowledge of the upper limit of normal BP values.
2. Ability to identify one's own BP values as normal or elevated — blood pressure classification (BPC).
3. Knowledge of complications of untreated hypertension (C-HTN).

Hypertensive subjects were defined as subjects with the mean BP (calculated from the 2<sup>nd</sup> and 3<sup>rd</sup> measurement during a single visit) of  $\geq 140/90$  mm Hg and/or receiving anti-hypertensive treatment. A positive family history of death due to CVD was defined as a reported death of the father or the mother due to stroke and/or MI (regardless of the age at the time of death).

### Statistical analysis

Chi-square test was used to compare proportions of knowledgeable persons between various analysed groups selected based on age, education level, etc. Multivariate logistic regression was used to evaluate independent association between knowledge on HT and sociodemographic factors and elements of medical history. For the purpose of logistic regression analysis, knowledge on HT was expressed as a knowledge index, calculated as the weighted mean of BPC ability (3 possible values, Table 1) and knowledge of C-HTN (6 values), or the knowledge index =  $[(3 \times \text{BPC}) + (6 \times \text{C-HTN})]/9$ . Mean values of the knowledge index were calculated for men and women. A  $p$  value  $< 0.05$  was considered statistically significant. Statistical analyses were performed using the SAS statistical package, version 9.2.

## RESULTS

Knowledge regarding HT was generally better among women than men (the knowledge index  $1.44 \pm 0.72$  in women vs  $1.28 \pm 0.67$  in men). Overall, 51% of men and 56% of women reported they knew the upper limit of normal BP values. However, among those who answered positively to the question regarding the upper limit of normal BP values, about 14% of both men and women identified it within the high normal BP range, 35% identified it within the normal BP range, nearly 1% identified it within the optimal BP range, 40% reported it at the level corresponding to stage I HT, and 8% of men and 6% of women reported it at the level corresponding to stage II or III HT (Fig. 1).

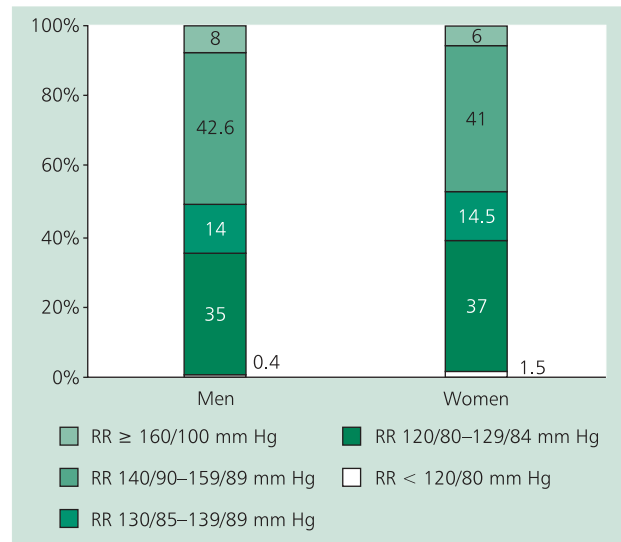
More men than women were not aware of their BP values. Among those who declared awareness of their BP values, the latter were classified correctly by 55% of women and 43% of men (Fig. 2).

The most commonly reported complications of untreated HT were stroke and MI. More than one third of men and one fifth of women knew no complications of HT (Fig. 3). Among five conditions listed in the questionnaire as possible complications of untreated HT, the respondents usually reported two conditions, and all 5 conditions were reported by only 2% of men and 3% of women. Awareness of kidney and

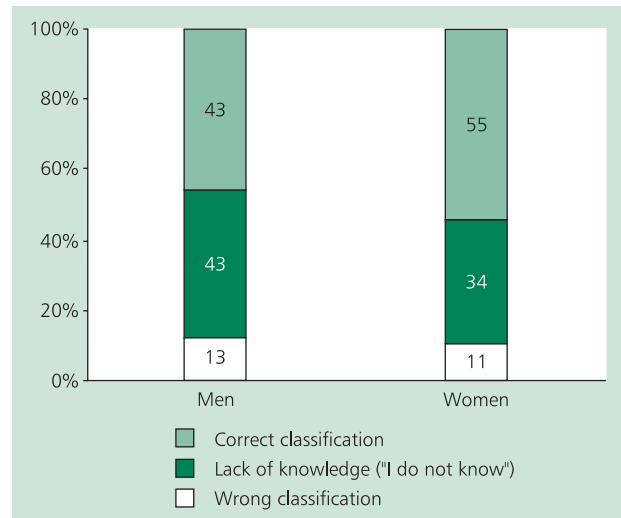
**Table 1.** Knowledge on complications of untreated hypertension among men (percentages of subjects who indicated specific conditions)\*

Complications	Education			Age [years]			Family history of CVD death			Hypertension				
	Elementary	High school	University	20-34	35-54	55-74	No	Yes	No	Yes	No	Yes		
		level	P	P	P	P		P		P		P		
Stroke	51%	61%	71%	0.0001	48%	61%	62%	0.0001	56%	65%	0.0001	53%	64%	0.0001
Myocardial infarction	54%	65%	76%	0.0001	54%	63%	60%	0.0001	59%	64%	0.0001	56%	65%	0.0001
Atherosclerosis	14%	24%	34%	0.0001	19%	22%	18%	0.001	19%	20%	NS	18%	22%	0.0004
Kidney disease	4%	7%	12%	0.0001	5%	6%	7%	NS	6%	8%	0.0018	5%	8%	0.0001
Eye disease	4%	7%	10%	0.0001	5%	6%	6%	NS	6%	6%	NS	5%	6%	0.0014
I do not know any complications	34%	29%	13%	0.0001	36%	25%	26%	0.0001	30%	22%	0.0001	32%	23%	0.0001

\*More than one choice was allowed; CVD — cardiovascular disease



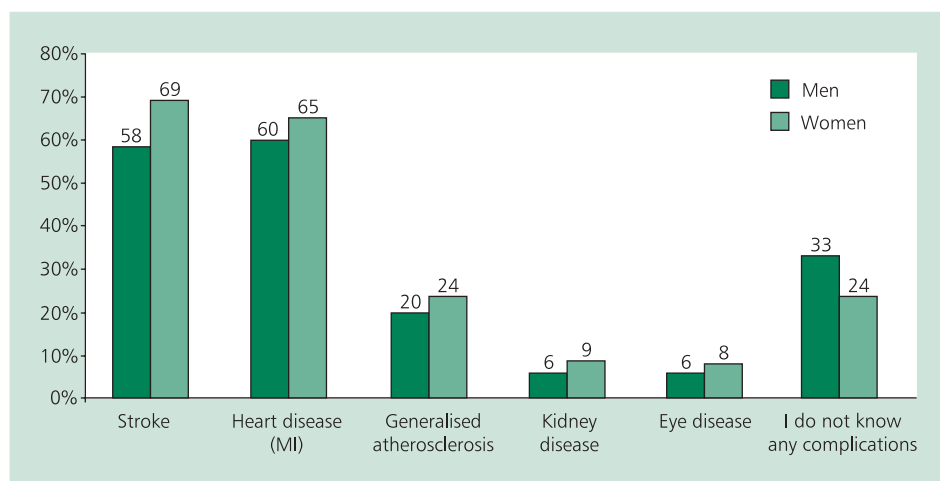
**Figure 1.** Distribution of answers to the question regarding the upper limit of normal blood pressure



**Figure 2.** Ability to categorise blood pressure as normal or elevated

eye diseases as possible complications of untreated HT was very low (these complications were reported by only 6–9% of the respondents).

Knowledge on complications of untreated HT was significantly related to, among others, the education level and age of the respondents. The proportion of subjects reporting specific conditions as complications of HT increased with the education level and age among both men and women, e.g. 71% of men and 76% of women with higher (university level) education reported haemorrhagic stroke as a complication of untreated HT, compared to 51% of men and 63% of women with primary education only (Tables 1, 2). In addition,



**Figure 3.** Complications of untreated hypertension (percentages of subjects who indicated specific conditions — more than one choice was allowed; MI — myocardial infarction)

subjects with established HT and subjects with a positive family history of death due to MI or stroke had increased knowledge of complications of untreated HT compared to subjects without HT or no family history of CVD death (Tables 1, 2). Of note, 23% of men and 15% of women with established HT were not able to list any complication of untreated HT.

Among men, knowledge on HT was found to be significantly positively and independently correlated with the education level and the diagnosis of HT, either treated or not. Among women, a positive correlation was found between all the analysed variables except for untreated HT (Table 3).

## DISCUSSION

Arterial hypertension is a common condition worldwide, including the Polish population. Based on BP measurements performed during a single visit in the WOBASZ study, the prevalence of HT in Poland was estimated at about 42.1% men and 32.9% women aged 20–74 years [2], although it should be acknowledged that BP measurements during a single visit result in overestimation of the true prevalence by several percentage points. Effective prevention of CVD, including arterial HT, requires identification of areas of insufficient knowledge to target prevention efforts appropriately, and dissemination of knowledge regarding potential risks (i.e., risk factors and consequences of untreated disease) in the community to induce healthy lifestyle changes. The WOBASZ study and its present analysis contributed to the evaluation of knowledge regarding health issues in the Polish population and its variation. It was the first study performed at such a large scale in a representative sample of the Polish population (including more than 13,000 of the study subjects). It showed, among others, insufficient knowledge regarding HT in the Polish population, with generally better knowledge among women compared to men.

Results of four surveys performed in Poland in 1994–2005 showed that overall awareness of BP values decreased significantly from 71.0% in 1994 (NATPOL I) to 65.5% in 1997 (NATPOL II) [8] and 59.0% in 2002 (NATPOL Plus) [12], and it was 61.0% in the WOBASZ study (2003–2005). In all these studies, awareness of BP values was higher in women compared to men, among more educated subjects, and among inhabitants of large cities. In 1990s, awareness of BP values in Poland was higher by several percentage points compared to, e.g., Spain, Canada, and the United Kingdom [13, 14].

In our study, 44% of men and 34% of women did not know their BP values. Similar results were obtained in the Narodowy Test Zdrowia (National Health Test) set up by the Department of Internal Medicine, Hypertension, and Angiology at the Medical University of Warsaw at the Onet.pl site ([www.medonet.pl](http://www.medonet.pl)). Those findings, similarly to the results of the WOBASZ study, indicate a low level of health status awareness in the Polish population (80% of Poles do not know their cholesterol level, 70% do not know their glucose level, and 40% do not know their BP values, but 66% of them consider themselves healthy). In contrast to the WOBASZ study, participants of the Narodowy Test Zdrowia were volunteers who were not representative for the general population (two thirds of the responders were women, as 51% were aged 18–39 years, with a low proportion of the elderly subjects, which does not correspond to the overall structure of the Polish population), but findings of this survey are interesting due to a large size of the evaluated sample (120,000 subjects completed the test by the beginning of December 2010).

In an American study regarding knowledge on HT, performed in a small and likely more motivated group of 202 adolescents aged 12–18 years, coming from families characterised by a high prevalence of HT, these subjects were fo-

Table 2. Knowledge of complications of untreated hypertension among women (percentages of subjects who indicated specific conditions)\*

Complications	Education		Age [years]			Family history of CVD death			Hypertension			
	Elementary	High school	University level	20–34	35–54	55–74	No	Yes	P	No	Yes	P
Stroke	63%	73%	76%	58%	72%	71%	66%	75%	0.0001	66%	77%	0.0001
Myocardial infarction	56%	70%	74%	61%	67%	63%	65%	67%	0.0001	64%	68%	0.0017
Atherosclerosis	15%	28%	37%	21%	25%	20%	23%	24%	0.0001	23%	24%	NS
Kidney disease	5%	11%	15%	8%	10%	8%	9%	9%	0.0013	9%	10%	NS
Eye disease	5%	10%	14%	8%	9%	8%	8%	9%	NS	8%	9%	NS
I do not know any complications	27%	16%	12%	28%	16%	19%	22%	16%	0.0001	22%	15%	0.0001

\*More than one choice was allowed; CVD — cardiovascular disease

und to be well aware of the definition and consequences of HT, but they were less knowledgeable regarding symptoms of HT [15]. Similar results were obtained in a Polish survey including 240 second year students of natural sciences at the four largest public university-level institutions in Wrocław. In that study, 47.4% of men and 50.4% of women correctly indicated the lower limit of the hypertensive range (140/90 mm Hg), and 95.5% of men and 84.7% of women correctly defined optimal BP [16]. In our study, however, knowledge regarding the definition of HT was very low, and 8% of men and 6% of women identified the upper limit of normal BP as  $\geq 160/100$  mm Hg, and about 35% of the respondents identified it as  $< 130/85$  mm Hg.

University students in Wrocław were also surprisingly well informed regarding complications of untreated HT, as more than 90% of them listed MI and about 80% listed stroke as major complications (compared to 50–60% of respondents in our study), and 45.0% of men and 23.9% of women listed renal failure as a complication of HT [16]. In the WOBASZ study, awareness of renal disease resulting from HT was very low (less than 10% of respondents).

A relationship between socioeconomic status or education level and awareness of CVD risk factors is well known and has been confirmed in many studies [17–20]. In our study, both men and women who finished their education at the elementary school level were less likely to list specific complications of untreated HT compared to subjects with university level education.

It seems that subjects with established HT or a family history of MI or stroke may be expected to have more thorough knowledge regarding their own BP values, the upper limit of normal BP, and complications of untreated HT, as awareness of personal disease or increased cardiovascular risk compared to healthy persons should motivate them to increase their knowledge on health-related issues. This was not confirmed in an American study involving students and adults, however, as personal or family history of a cardiac disease did not lead to increased knowledge regarding health [21]. The opposite was found in the WOBASZ study, as subjects with established HT or a family history of death due to CVD were more likely to list complications of untreated HT. Of note, however, about 23% of men and 15% of women with established HT were still not able to list any complications of HT.

Gans et al. [5] analysed findings of the Pawtucket Heart Health Program (PHHP), one of the three largest US projects regarding CVD prevention through community interventions, and found that knowledge on risk factors and approaches to CVD prevention was higher among better educated subjects, women, and younger persons. Similar results were reported in other studies [2, 3, 9], and also in our study, except for the effect of age on knowledge regarding HT (in our study, older subjects were better informed). This confirms the need to monitor health-related knowledge so as to target community interventions appropriately.

**Table 3.** Odds of knowledge regarding hypertension above the mean value in the study population (multivariate logistic regression)

Variable	Men		Women	
	Odds ratio (95% CI)	P	Odds ratio (95% CI)	P
Age [years]	1.00 (0.98–1.01)	NS	1.00 (1.00–1.01)	0.0411
Education (elementary, high school, university level)	1.60 (1.49–1.73)	< 0.0001	1.88 (1.75–2.02)	< 0.0001
Place of residence (small, medium-sized, large commune)	1.03 (0.97–1.09)	NS	1.08 (0.91–1.14)	0.0095
Positive family history of CVD death:				
No	1.00		1.00	
Yes	1.12 (0.99–1.27)	NS	1.15 (1.03–1.29)	0.0145
Hypertension:				
No	1.00		1.00	
Yes — treated	1.92 (1.65–2.22)	< 0.0001	1.77 (1.54–2.02)	< 0.0001
Yes — untreated	2.02 (1.57–2.58)	< 0.0001	0.98 (0.76–1.27)	NS

CI — confidence interval; CVD — cardiovascular disease

## CONCLUSIONS

Knowledge concerning HT is still insufficient in the Polish population, both among healthy persons and subjects with established HT. Age, education level, family history of death due to CVD, personal history of HT, and particularly receiving treatment for HT were significant independent predictors of knowledge level. Women, better educated subjects, women with a positive family history of parent death due to MI or stroke, and subjects with established HT, especially when treated, were more knowledgeable regarding health-related issues. Prevention and health education programs are necessary to improve the current situation in the Polish population, targeted particularly at men and less educated subjects.

**Conflict of interest:** none declared

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# Wiedza o nadciśnieniu tętniczym w populacji polskiej. Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia Ludności (WOBASZ)

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## Streszczenie

**Wstęp:** Niewystarczająca wiedza na temat czynników ryzyka chorób układu sercowo-naczyniowego, nieświadomość schorzeń i ich powikłań może powodować istotne ograniczenia efektywności prewencji. Istnieje zatem konieczność monitorowania wiedzy zdrowotnej w celu przygotowania jak najlepszych programów prewencji.

**Cel:** Celem niniejszej pracy była ocena wiedzy zdrowotnej dotyczącej nadciśnienia tętniczego w zależności od płci, wieku, poziomu wykształcenia, statusu nadciśnienia tętniczego i dodatniego wywiadu rodzinnego w kierunku zgonu z powodu zawału serca i/lub udaru.

**Metody:** Badaniem objęto reprezentatywną próbę populacji polskiej (13 545 osób) w wieku 20–74 lat, zbadanych w latach 2003–2005 w ramach programu WOBASZ. Dane zebrano przy użyciu kwestionariusza. Analizowano, ilu badanych zna wartości swojego ciśnienia tętniczego i klasyfikuje je prawidłowo, zna górne granice prawidłowego ciśnienia, a także powikłania nieleczzonego nadciśnienia tętniczego.

**Wyniki:** Wśród badanych 51% mężczyzn i 56% kobiet twierdziło, że zna wartości prawidłowego ciśnienia ( $p < 0,0001$ ). Jednocześnie ok. 50% z nich lokowało prawidłowe ciśnienie w zakresie normotensji, 40% w grupie I nadciśnienia tętniczego, a 8% mężczyzn i 6% kobiet nawet powyżej 160/100 mm Hg; 59% mężczyzn i 69% kobiet potwierdziło znajomość wartości swojego ciśnienia tętniczego ( $p < 0,0001$ ), ale spośród nich tylko 72% mężczyzn i 80% kobiet prawidłowo je klasyfikowało. Najczęściej wymienianymi powikłaniami nieleczzonego nadciśnienia tętniczego były udar i zawał serca. Jednocześnie 32% mężczyzn i 23% kobiet nie znało żadnych powikłań nadciśnienia tętniczego ( $p < 0,01$ ). Osoby starsze, lepiej wykształcone, z dodatnim wywiadem rodzinnym w kierunku zgonu z powodu zawału serca i/lub udaru oraz z nadciśnieniem tętniczym posiadały większą wiedzę na temat nadciśnienia tętniczego.

**Wnioski:** Wiedza zdrowotna dotycząca nadciśnienia tętniczego jest wciąż niewystarczająca w populacji polskiej. Płeć, wiek, wyższe wykształcenie, rozpoznane nadciśnienie tętnicze oraz dodatni wywiad rodzinny w kierunku zgonu z powodu zawału serca lub udaru okazały się czynnikami istotnie i niezależnie modyfikującymi poziom wiedzy zdrowotnej.

**Słowa kluczowe:** nadciśnienie tętnicze, wiedza zdrowotna, badanie przekrojowe

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