

# Why some treated patients with arterial hypertension do not report of having it: findings from epidemiological studies

Piotr S. Szczęsny , Kacper Jagiełło , Krzysztof Flis , Tomasz Zdrojewski 

Department of Preventive Medicine and Education, Medical University of Gdańsk, Gdańsk, Poland

## Abstract

**Background:** Diagnosis of hypertension (HT) in epidemiological studies sometimes requires careful clinical evaluation. This may be particularly challenging in the subgroup of patients taking antihypertensive drugs for indications other than HT.

**Material and methods:** The PolSenior2 study was conducted on a representative sample of Polish residents aged 60 or older. Blood pressure measurements were taken three times during two separate visits in a total of 5,981 people (2,920 men and 3,044 women). The diagnosis of HT was made according to the European Society of Cardiology and European Society of Hypertension (ESC/ESH) criteria. On this basis, 4607 people were classified as having HT. Among them, 424 respondents were taking antihypertensive drugs, but were not aware of having the disease. Additional analysis was performed, consisting of a detailed telephone questionnaire and additional clinical assessment of potential comorbidities. The researchers managed to contact 269 people, of whom 265 agreed to participate in the study.

**Results:** Based on the answers obtained, the respondents were divided into four subgroups: A. 54 (20.4%) respondents confirmed they had been diagnosed with HT and admitted that they considered the fact of taking medications as the absence of the disease; B. 79 (29.8%) respondents were not aware of HT, but the available clinical data indicated taking antihypertensive drugs due to HT; C. 79 (29.8%) of the respondents declared having HT, which may indicate that during the study they gave the wrong answer or their answer was incorrectly recorded by the research team member; D. 53 (20.0%) respondents answered “I don’t know/I don’t remember”. There were no differences in the distribution of responses between those with elevated and normal blood pressure, or between the age groups of 60–79 and over 80.

## Conclusions:

1. A small percentage of patients with HT (approx. 1.5%) may confuse good control of the disease with being cured of it. This indicates the need for better patient education.

2. On the other hand, some patients take antihypertensive drugs for reasons other than HT. Therefore, accurate determination of the diagnosis of HT in epidemiological studies requires obtaining complete medical documentation with detailed data on the reasons for prescribing drugs and comorbidities.


**Key words:** arterial hypertension; unawareness; epidemiological survey; diagnosis

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**Address for correspondence:** Dr. Piotr Szczęsny, Department of Preventive Medicine and Education, Medical University of Gdańsk, ul. Dębinki 7, 80–211 Gdańsk, Poland; e-mail: piotr.szczesny@gumed.edu.pl

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## Introduction

The nationwide PolSenior2 (PS2) study provided a lot of data on the prevalence of chronic diseases in the elderly population in Poland [1]. The researchers made every effort to ensure that the obtained data reflected the reality as closely as possible. With this in mind, objective criteria were used to classify respondents as having arterial hypertension (HT). The classification was based not only on the subjective declaration of the study participants, but also on blood pressure (BP) measurements made by a qualified medical professional, as well as on medications taken, chronic diseases and laboratory results. However, in people with BP below 140/90 mm Hg, it was difficult to determine what disease was the reason for taking antihypertensive drugs by the respondent. After completing the collection of survey and laboratory data, it was decided to additionally examine some of the respondents who declared that they were free from hypertension, but in whom the research team diagnosed this disease and, additionally, there was a high probability that the patient had been treated for hypertension. The aim of the study was to answer the question why some treated patients with arterial hypertension do not report of having it.

## Material and methods

The PS2 study was a cross-sectional study covering a representative sample of Polish residents aged 60 to 106. Blood pressure measurements were performed three times during two separate visits in a total of 5,981 patients, and the diagnosis of HT was made according to the European Society of Cardiology/European Society of Hypertension (ESC/ESH) and Polish Society of Hypertension criteria (BP  $\geq$  140/90 mm Hg or taking antihypertensive drugs). In 5,964 patients, including 2,920 men and 3,044 women, all the necessary information needed to qualify them into groups with and without HT was obtained, i.e., data from a standardized clinical interview, a list of medications taken and their doses, and blood pressure measurement results. Quality control was ensured by randomly checking every 10<sup>th</sup> respondent and collecting their opinion on the study and the way it was conducted, as well as by ongoing supervision of doctors over the data sent by nursing staff operating in the field. A detailed description of the assumptions, data collection and methods of the PolSenior2 study has been presented in another publication [2].

Using the study algorithm and the ESC/ESH criteria, 4607 were included in the HT group.

Most people were qualified as having HT on the basis of meeting one of the following criteria:

- declaration by the respondent of being diagnosed with hypertension and taking antihypertensive drugs in the last 14 days;
- blood pressure measurements from two visits, if on each of these visits the average of the two measurements of systolic blood pressure was greater than or equal to 140 mm Hg or diastolic blood pressure was greater than or equal to 90 mm Hg. Patients whose BP was measured on only one visit were qualified as having HT when the systolic blood pressure was greater than or equal to 160 mm Hg or the diastolic blood pressure was greater than or equal to 100 mm Hg.

In those who did not meet the above criteria, hypertension was diagnosed on the basis of an individual assessment, which included blood pressure values measured during study visits, all available medical history, all medications taken and laboratory results. This group included 424 respondents who:

- when asked if they had been diagnosed with HT, answered “no” or “I don’t know/I don’t remember”;
- were taking at least one antihypertensive drug which, in the opinion of the research team based on the available medical history, was prescribed for hypertension, which was the reason for qualifying these patients to the group with hypertension.

It was decided that additional telephone interviews should be conducted with these patients using a specially designed questionnaire to verify their answers regarding the awareness of HT.

In the first step, a member of the research team contacted respondents who had provided their phone number in the PS2 survey, making at least three attempts to contact them by phone at different times of the day. In the second step, letters were sent to respondents who could not be contacted by phone or whose telephone number was unknown, asking them to call the research team.

During the interview, a question was asked according to a previously developed standard questionnaire: Do you suffer from hypertension?

In the case of a negative answer, the following questions were asked: For what disease do you use the following drugs (listing drugs used, among others, in antihypertensive therapy)? Based on the responses received, four categories were distinguished:

- **A.** The respondent answered negatively to the first question of the questionnaire, but when asked

- about antihypertensive drugs, they indicated arterial hypertension as the reason for their use;
- **B.** The respondent's answer to the first question of the questionnaire was negative, but when asked about antihypertensive drugs, they suggested that they were taking these drugs for other reasons;
  - **C.** The respondent, answering the first question, confirmed that they had hypertension,
  - **D.** The respondent was not aware of their state of health and could not answer this question; they answered "I don't know/ I don't remember".

## Results

The study group consisted of 424 respondents (including 193 female patients (F) and 231 male patients (M)) meeting the criteria described above; they accounted for 9.2% of the HT patients in the PS2 study. Finally, 265 respondents were accessed (F = 122, M = 143), whereas the others could not be contacted for various reasons (58 people were dead when contact was attempted and 101 respondents could not be accessed).

Table 1 shows the distribution of answers among the 265 respondents (F = 122; M = 143) who were available for the interview, depending on the age group: 60 to 79 years (including 147 people) versus 80 years or older (including 118 people).

The data presented above show a similar distribution of responses among categories. There was no statistically significant difference between the age groups. Most of the answers were classified as categories B and C.

Respondents assigned to category A (F = 27, M = 27) accounted for almost one-fifth of the surveyed group of 265 people and 1.2% of respondents with HT in the PS2 study. As it turned out, they

were correctly qualified to the HT group. These were people who confirmed the presence of hypertension only after repeated detailed questioning about the antihypertensive drugs they were taking. They admitted that during the main study, they considered that taking the medication and having satisfactory blood pressure meant that they were cured and free of hypertension.

People in category B (F = 40, M = 39) believed that antihypertensive drugs were prescribed due to another disease, and almost half of them (N = 37; F = 15, M = 22) despite the use of at least one antihypertensive drug, had elevated BP values, indicating insufficient control of hypertension. The most frequently reported diseases were cardiac arrhythmia and secondary prevention after myocardial infarction. In the opinion of the research team, taking into account the available medical history, laboratory tests and other medications used, these people should be classified as having HT because the interpretation of the available clinical data indicated that blood-pressure-lowering drugs were prescribed for HT.

Respondents in category C (N = 79; F = 34, M = 45) immediately confirmed that they were aware of having HT, which may indicate that they gave the wrong answer during the PS2 study or that it was written down incorrectly by the nurses conducting the interview. Among these people there may also be those who did not understand the question when interviewed in the PS2 study and, when asked a second time, immediately declared that they had HT. People from this group were classified as HT in the PS2 study and accounted for 1.7% of all HT patients.

Category D (N = 53; K = 21, M = 32) included people who did not have a good understanding of their health status and could not answer the question why they were taking medications. These were usually people whose state of health and level of

**Table 1.** Distribution of answers in the entire study group

	60–79 (n = 147)	80+ (n = 118)	Total (n = 265)	p-value
Category				0.434
<b>A.</b> The respondent confirms that they suffer from hypertension when asked about antihypertensive drugs taken	19.7% (29)	21.2% (25)	20.4% (54)	
<b>B.</b> The respondent suggests that they take antihypertensive drugs for a different reason	31.3% (46)	28.0% (33)	29.8% (79)	
<b>C.</b> The respondent, unlike in the main study, immediately confirms that they have hypertension	32.7% (48)	26.3% (31)	29.8% (79)	
<b>D.</b> The respondent does not know whether they have hypertension or what drugs they are taking	16.3% (24)	24.6% (29)	20% (53)	

**Table 2.** Distribution of answers in the group of subjects with normal blood pressure ( $\leq 140/90$  mm Hg)

	60–79 (n = 79)	80+ (n = 69)	Total (n = 148)	p-value
Category				0.268
A. The respondent confirms that they suffer from hypertension when asked about antihypertensive drugs taken	22.8% (18)	18.8% (13)	20.9% (31)	
B. The respondent suggests that they take antihypertensive drugs for a different reason	25.3% (20)	31.9% (22)	28.4% (42)	
C. The respondent, unlike in the main study, immediately confirms that they have hypertension	35.4% (28)	30.4% (21)	33.1% (49)	
D. The respondent does not know whether they have hypertension or what drugs they are taking	16.5% (13)	18.8% (13)	17.5% (26)	

awareness made it impossible to collect an accurate, appropriate and factually correct interview.

In the study group of 265 people who were verified as to their awareness of having HT, 148 patients had normal BP. Therefore, only in this group could there be people overqualified to the HT group. Therefore, Table 2 analyzes a group of 148 respondents (F = 76; M = 72) with blood pressure values  $\leq 140/90$  mm Hg. There were 79 people in this group aged 60 to 79, and 69 people aged 80 and over.

As in the entire study group, also among people with normal BP values, no statistically significant differences among the categories were observed. As in the general group, most responses were classified into categories B and C. The above data suggest that proper BP control had no significant impact on HT awareness.

## Discussion and conclusions

This study that assessed the quality of the data from the PS2 study allowed the investigators to gain more confidence in the reported HT results. Proper public health decision-making requires reliable and well-documented data based on extensive research.<sup>2</sup> Misreporting of the prevalence and awareness of HT can lead to inappropriate prevention planning, access to health care, and misallocation of public funding [1–3]. Therefore, precise analysis and confirmation of the diagnosis of HT in epidemiological studies is important and often requires a thorough clinical assessment.

In survey-based research, the respondents may fail to provide the correct answer if they do not understand the question, or if a diagnosis has not been made previously, and may withhold information for other personal reasons [3–6].

Particularly challenging may be the subgroup of patients taking antihypertensive drugs for indi-

cations other than HT, e.g., secondary prevention of myocardial infarction, heart failure, etc.

The percentage of patients who declare the presence of the disease is usually lower than its real prevalence. Therefore, to increase the credibility of data, when preparing population studies, it is recommended to supplement the subjective response of the examined person regarding their health condition with an objective measurement that is easy to interpret by the research team, to confirm the information obtained [3].

The presented results confirm that some patients may confuse disease control with its cure<sup>3</sup> although this is a small percentage of all respondents among those classified as HT in the PS2 study. At this point, it is worth emphasizing that nearly half of the people who, despite taking medications, were not aware of their disease, did not have their blood pressure sufficiently controlled.

Factors that increase disease awareness include regular blood pressure checks (both home and office BP measurements) and providing patients with health education, such as lectures, brochures etc. [5]. More frequent contact with health-care may also contribute to patients' greater awareness of their health condition and the disease they suffer from [3, 6]. On the other hand, male gender [3, 4, 6, 7] as well as lower education or lower socio-economic status may be a factor contributing to the unawareness of HT [8]. Taking into account the fact that the awareness of having HT improves the effectiveness of its treatment [9], special attention should be paid to these patients in clinical practice.

In the absence of statistically significant differences between the age categories, it should be noted that this study included elderly population. Data from other studies indicate that the awareness of HT and the percentage of people receiving antihypertensive treatment may be significantly different in younger age groups [8, 10, 11].

The lack of a statistically significant difference between the 60–79 and 80+ age groups indicates the need for a thorough interview to get the right answers from the respondents, as well as the need for good education of patients regardless of age.

The presented results may explain to some extent the cause of errors in HT research, and may also be useful for more accurate planning of further research in the field of public health.

The limitation of this study was the fact that some of the respondents were already dead at the time of verification. This was especially true for people over 80 years of age. Also, the fact that the researchers failed to contact 101 respondents could have influenced the results presented above.

A telephone interview was chosen as the method of verifying the answers in the questionnaire, which, despite its limitations resulting from the lack of direct contact with the respondent, allowed the researchers to focus only on the issue of the respondent's suffering from HT, enabling an in-depth discussion regarding this issue and a more thorough verification by means of a questionnaire in which, apart from closed questions, also open questions were asked, allowing the researcher to gain a better orientation in the respondent's awareness of their health condition.

In order to obtain 100% certainty and verify the answers of 42 respondents (F = 25, M = 17) from category B, which constituted 0.9% of people classified as having HT in the PS2 study, who suggested that they take antihypertensive drugs for another reason, and who had normal BP values, the researchers would have to contact the respondents' health-care providers and review their detailed medical records. Taking into account the difficulties related to communication and verification of detailed clinical data in the practice of a family doctor for the purposes of the epidemiological study, as well as problems regarding legal issues related to the protection of personal data, further verification of these data was abandoned.

In conclusion, the results obtained in this study indicate insufficient awareness of HT among the elderly and the need for better patient education. In addition, patients should be encouraged to perform home BP measurements.

Special attention should be paid to people who, although taking antihypertensive drugs, are not aware of having HT and do not obtain normal BP values. In these people, raising the level of awareness of HT could improve BP control.

Available studies confirm that a small percentage of patients with HT (approx. 1.5%) may confuse good control of the disease with being cured of it.

Efforts should be made to ensure that the staff collecting data from respondents in population studies is properly qualified, and that the scope of collected data includes drugs taken and the reason for their use. A review of the medical records of some groups of patients should also be carried out if needed, which could significantly improve the quality of the data obtained.

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