

## Efficiency of implementation of the regional target program for the treatment of patients with arterial hypertension at the regional level (experience of the Vologda Oblast)



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**Abstract.** The authors have performed a monitoring medico-sociological research aimed to study the system for organizing the treatment of patients with arterial hypertension (AH) at the territorial level. The survey was conducted among physicians in 2010. The results of this examination are presented as a set of filled-in expert assessment charts. The randomized sample (338 people) was effected by random selection. Sampling error does not exceed 5% ( $\alpha = 0.95$ ). The authors have analyzed the representative data in order to assess the quality of implementation of the program “Prevention and treatment of arterial hypertension in the Vologda Oblast population” and provide analytical support in management decision-making. The authors have also assessed the demographic and economic losses due to health deterioration caused by diseases of the circulatory system. In addition, the authors have proposed the measures to improve health care practices in order to enhance the efficiency of using people’s labor and life potential.

**Key words:** arterial hypertension, risk factors, target program, expert assessment charts, economic and social efficiency of treatment, data analysis, decision making.

Diseases of the circulatory system (DCS) constitute 54–56% in the structure of the total mortality of the population. In 2010 mortality in the Russian Federation (per 100 thousand population) from DCS was as follows: from heart attack – 47.2; from stroke – 154.7; from arterial hypertension – 17.9. But arterial hypertension (AH) is the most important risk factor in the development of DCS, including coronary heart disease and cerebrovascular disease.

Scientific research reveals the high prevalence of AH in adult population. It is 35–40% in different countries and regions. However, the incidence of hypertension in the official medical statistics that gather data according to the incidence of outpatient visits is much lower than the prevalence that is considered in scientific research; this fact is reflected in federal and regional laws and regulations [12; 14; 15; 16].

And in this respect it is important that the target program “Prevention and treatment of arterial hypertension in the Vologda Oblast population” (oblast target program) has been functioning since 1998. The program helps identify patients with AH at early stages. Besides, a technology of implementing the system for early detection of patients with AH in hospitals (the model for detection, registration and monitoring of patients with AH) also serves the same purpose. Due to dedicated work of primary care physicians, the number of identified patients with AH increased from 22549 in 1998 to 105476 in 2010 [2; 20].

According to medical statistics provided by the Vologda Oblast Department of Health Care, these activities helped stabilize mortality from DCS.

This study aims to assess the quality of implementation of the program “Prevention and treatment of arterial hypertension in the Vologda Oblast population”.

The research carried out in different years in Russia and in the Vologda Oblast shows that the number of cases of AH depends on the methods used: a full-design, family, sampling research. Much less is detected by primary health care physicians through the incidence of outpatient visits.

The number of identified patients with arterial hypertension at health care facilities (hospitals) depends on the availability of primary health care physicians. A significant factor is the training of the population in health schools, motivation of personal responsibility for one’s own condition, compliance (the degree of consistency between the patient’s behavior and the recommendations obtained).

Basic regulations that provide dynamic monitoring of patients with AH are the ambulatory medical record on the form No. 025u approved by the Ministry of Health Care of the RSFSR of October 04, 1980 No. 1030, and the record of regular medical check-up. The Order of the Ministry of Health Care of the Russian Federation of January 23, 2003 No. 4 “On the measures to improve the organization of medical care of patients with arterial hypertension in the Russian Federation” recommended the record of case monitoring of patients with AH (form 140/4-02, Appendix No. 3).

The Vologda Oblast Department of Health Care has approved the record of expert assessment of efficiency of treatment of patients with AH, which provides an

opportunity to assess the effectiveness of efforts undertaken to reduce cardiovascular risk. The examination is performed by a physician, a head of department, a deputy chief physician of a health care facility, an employee of the Territorial Fund of Compulsory Medical Insurance.

The expert examination:

- contributes to a more efficient identification of patients with AH in the early stages of the disease;
- helps the attending physician to assess underlying risk factors in the patient, diseases of target organs, and associated clinical conditions;
- helps to reduce the impact of specific risk factors;
- helps the patient to achieve the desirable blood pressure level.

The record of expert assessment allows primary health care physicians to improve the organization of preventive and medical work during regular medical check-up of patients with AH.

The record includes 21 points and it is a type of a sociological survey with nominal characteristics. Six variables are categorical (two-digit nominal). Fifteen are treated as variables with multivariate responses (multi-valued nominal). The characteristic of reducing the impact of major risk factors when processing is specified as a multi-dimensional dichotomy for six variables. The stage of arterial hypertension (first, second, third) and the degree of risk of cardiovascular complications (from low to very high) are determined in accordance with the recommendations of the All-Russian Scientific Society of Cardiologists

(ARSSC). The monitoring by specialists in the health care facility is established by the presence or absence of their records in the outpatient record. Information on major risk factors, associated clinical conditions in patients is also determined on the basis of their outpatient records. The possibility of missing data (*not available* – *NA*) is taken into account when filling in the records.

Efficiency is assessed using ordinal scales that have scores from 0 to 5. The highest score is the best. Ten characteristics are estimated according to the instruction. The integral assessment of efficiency is made after the summation:

- efficiency is sufficient (30 points);
- efficiency is low (16–29 points);
- treatment is inefficient (15 or less points).

The approach under consideration is basic and it is individual for each patient. The most frequent task, in the decision of which one has to deal with nominal characteristics, is the processing of the questionnaires by type of sociological research. The set of the filled expert assessment records contains different combinations of symptoms that occur with varying frequency.

When conducting the research in 2010, the Vologda Oblast Department of Health Care has sent its institutions the expert records for assessing the effectiveness of treatment of patients with AH (according to the ambulatory medical record No. 025u). Three hundred and thirty-eight questionnaires were received from medical institutions of the oblast municipalities. Out of them 86.1% was included in the register of AH (291 questionnaires).

For  $n = 338$  and for the accuracy of the estimate in the range from 0.01 to 0.1 the quantiles and their orders were calculated (for reliability in ensuring the given accuracy). The calculation has shown that the volume of generated sample provides the necessary precision of the estimate within 0.05 with a confidence probability  $\alpha = 0,95$ . The accuracy of not less than 5% of the share of objects with properties under consideration seems to be quite reasonable, and it meets the requirements for the research of this kind<sup>1</sup>.

The study of the sources and their analysis were compared with the aims and methods presented in the literature.

A comparative assessment of the quality of primary health care for patients with AH in various outpatient medical institutions of Saint Petersburg is given in [3]. The expert assessment of outpatient records revealed differences in the quality of their filling-in. The main disadvantages are: the lack of records on the examination of patients, on their consulting on risk factors for cardiovascular complications of AH. A higher quality of health care is observed in institutions that are organized by the type of general practice.

The results of the first survey conducted in the framework of the federal target program "Prevention and treatment of arterial hypertension in the Russian Federation" are presented in [1].

<sup>1</sup> Sample size depends on the required accuracy and reliability of the result and on the plan of sampling. In addition to simple random sampling plans one uses complex design sampling: stratification of sampled population; stratified, quoted and cluster selection and multistage sampling [4; 5; 9]. The choice of a particular sampling plan is often determined by financial and organizational limitations of the study.

The representative random samples were created according to nested design among men and women aged 15–75 living in seven federal districts. The prevalence of arterial hypertension was as follows: 40.4% – women, 37.2% – men. Awareness of its presence: women – 80.3%, men – 75%. Receive treatment: women – 63.1%, men – 53.1%. Out of them are treated effectively: women – 22.5%, men – 20.5%. The following drugs are prescribed most frequently: ACE inhibitors – 70.7%.

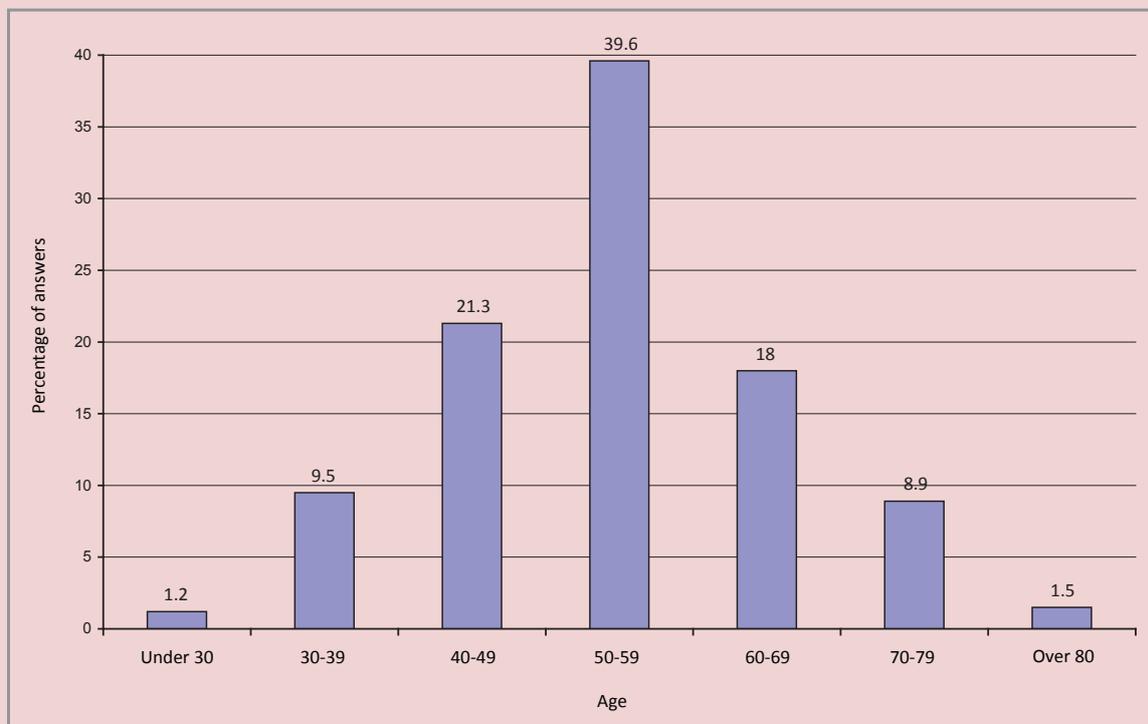
The work [10] is devoted to the impact of social factors on the prevalence and treatment of AH at the regional level (in Yakutia).

The studies on the impact of psychosocial factors on the development of "hypertension in the workplace" consider the development of AH depending on the profession, lifestyle and risk factors, including chronic stress and emotional burnout syndrome [6].

The use of modern technologies in sociological research and scientific observation as a methodological basis of medico-sociological monitoring makes it possible to evaluate the significance of medical and social problems, to carry out the situational analysis, and it also improves the quality of managerial decision-making. The development of comprehensive indicators makes it possible to quantify the population's health in the region, the socio-economic efficiency of health care and quality of medical aid [21; 22; 23].

The comparison of published works and our research shows that a significant part of the results is very similar. This confirms the importance, relevance and reliability of the assessments.

Figure 1. Distribution of patients with arterial hypertension by age, in %\*



\* Hereinafter: the proportion of significant indicators is given as a percentage of the total number of responses received.

What have we found out in the course of our research?

*First*, it has been revealed that with the increase in the age the number of patients with AH increases nonlinearly (*fig. 1*): in the period from 30 to 39 years – in 7.9 times, in the period from 30–39 to 40–49 years – in 2.2 times, and in the period from 40–49 years to 50–59 years – in 1.9 times. By the age of 50–59 the total percentage is 71.6% (242 questionnaires) of the number of responses. The distribution of answers by age shows that the maximum number – 39.6% of patients with AH (134 questionnaires) falls on the age of 50–59.

*Second*, in 67.5% of the patients (320 questionnaires) there are changes that affect one or more target organs (*fig. 2*).

*Third*, 43.5% of the patients (147 questionnaires) have a median risk of cardiovascular complications, and the risk is high and very high in 49.4% of the patients (167 questionnaires) (*fig. 3*).

*Fourth*, the duration of the disease in 38.8% (131 questionnaires) of the patients ranges from 5 to 10 years (*fig. 4*).

We have also found out that 82.2% of the patients (278 questionnaires) have a tonometer; 89.3% (302 questionnaires) of the patients undergo regular medical check-up;

Figure 2. Distribution of patients by stages of arterial hypertension (recommendations of ARSSC 2008), in %

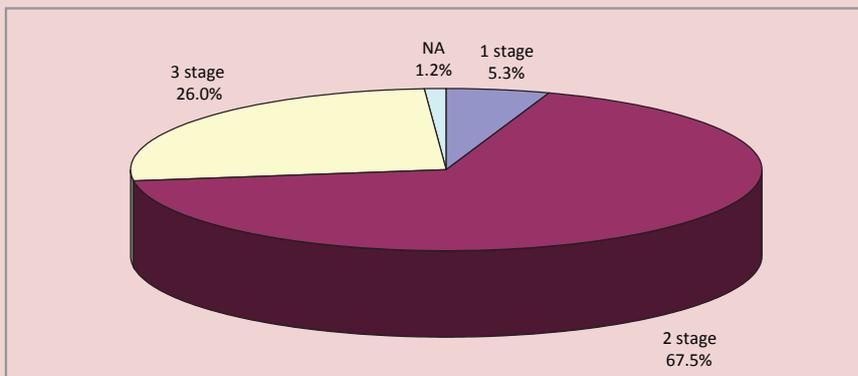


Figure 3. Distribution of patients by level of risk of cardiovascular complications (recommendations of ARSSC, 2008), in %

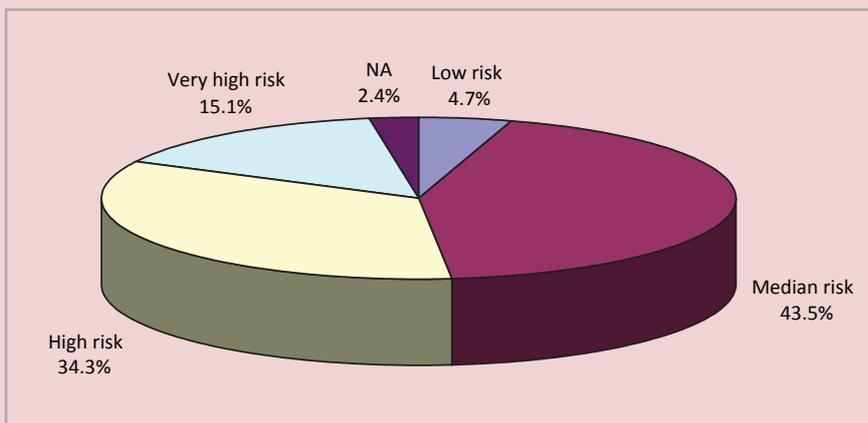
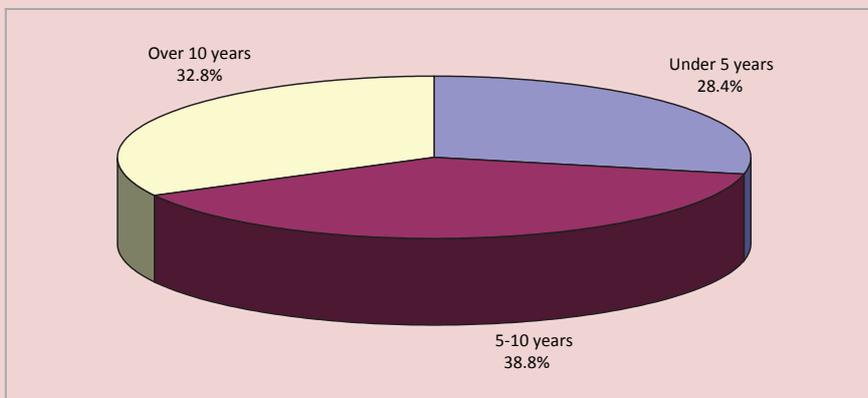


Figure 4. Distribution of patients by duration of the disease, %



55% (186 questionnaires) are followed up by a therapist, and 18.3% (62 questionnaires) – by a family doctor, 22.5% (76 questionnaires) by several specialists. No cases of examination by a neurologist and vascular surgeon have been detected.

*Fifth*, we have found out that additional data on major risk factors of AH contains no information about alcohol. 54.4% of the patients (184 questionnaires) have 2–3 factors. No data are available on 12.6% of the patients (43 questionnaires) (*fig. 5*).

*Sixth*, 27.8% of the patients (94 questionnaires) have two or more associated clinical conditions. There is a high percentage of data not available – 40.3% (136 questionnaires) (*fig. 6*).

Antihypertensive therapy has been prescribed in the polyclinic in 82.2% of the cases.

*Seventh*, antihypertensive therapy is carried out continuously for 93.5% of the patients (316 questionnaires) (*fig. 7*).

*Eighth*, antihypertensive therapy in 28.7% of the cases is performed by using a single drug; moreover, for 18.3% of the total number of patients (and, respectively, for 63.8% of the cases of use of a single medicine) ACE inhibitors are prescribed (*fig. 8*).

Combined antihypertensive therapy has been noted in 70.4% of the cases (238 questionnaires). Two medicines are prescribed for 42.9% of the patients (145 questionnaires) – in 60.9% of the cases when combined therapy is used (206 questionnaires); three medicines

are used for 21.9% (74 questionnaires) and 31.1% (105 questionnaires), respectively; four and more medicines are used for 5.6% (19 questionnaires) and 8.0% (27 questionnaires), respectively (*fig. 9*).

*Ninth*, 46.7% of the patients (158 questionnaires) were trained in the school for patients with AH.

The achievement of the target level of AH (systolic blood pressure below 140 mm Hg, diastolic blood pressure below 90 mm Hg) was noted in 57.7% of the cases (195 questionnaires) (*fig. 10*).

12.7% of the respondents (43 questionnaires) were registered as having a disability due to AH.

The results of the analysis of the sample for the characteristic “the reduction of the impact of major risk factors” are summarized in *table 1*.

As we can see from the table, the situation with physical activity is relatively favorable (30 minutes daily): 49.7% of the patients (168 questionnaires) note the reduction of risk. The situation with alcohol is worse: there is no reduction of risk for 85.2% (288 questionnaires). There is a contradiction: item No. 10 of the expert assessment record of additional data on major risk factors of AH has no information concerning alcohol. It is obvious that the cause of dissonance is of a cognitive nature. For the remaining four factors the reduction of risk is absent for 72.8–79% of the patients (246–267 questionnaires).

Figure 5. Major risk factors of hypertension, %

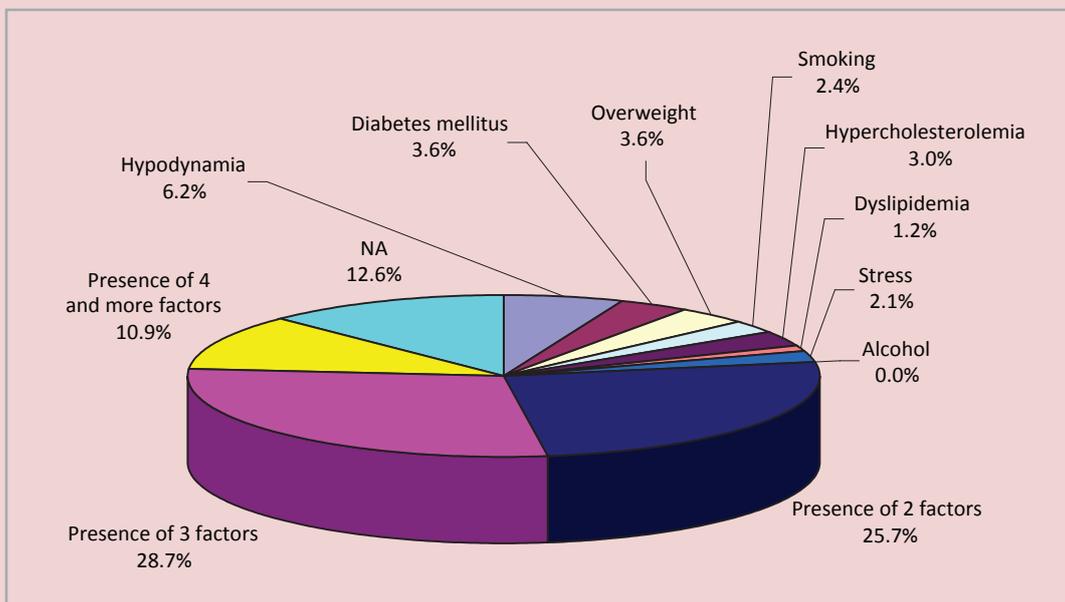


Figure 6. Distribution of patients according to the share of associated clinical conditions, in %

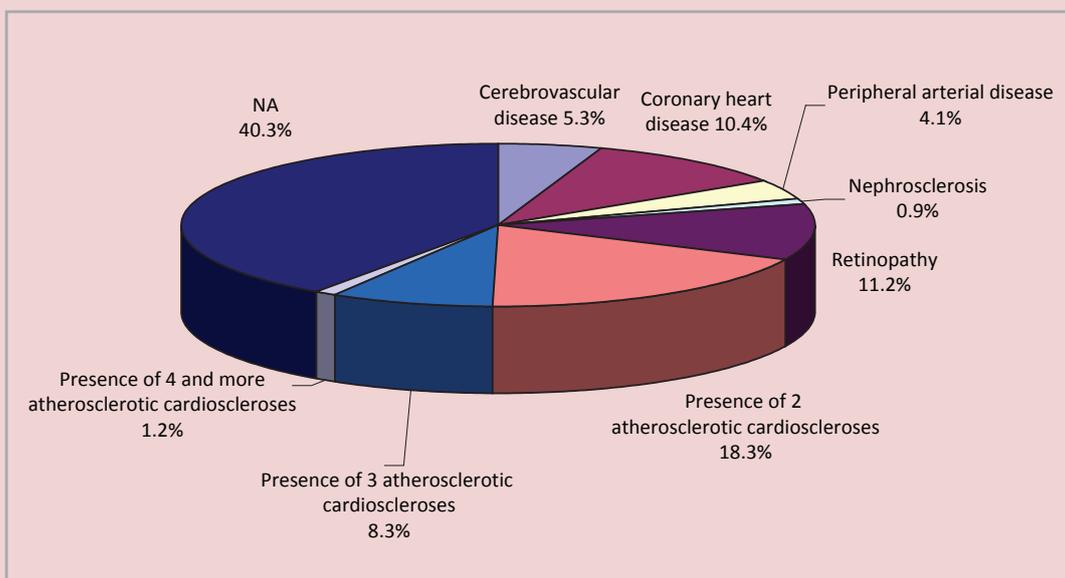


Figure 7. Distribution of patients by type of antihypertensive therapy,%

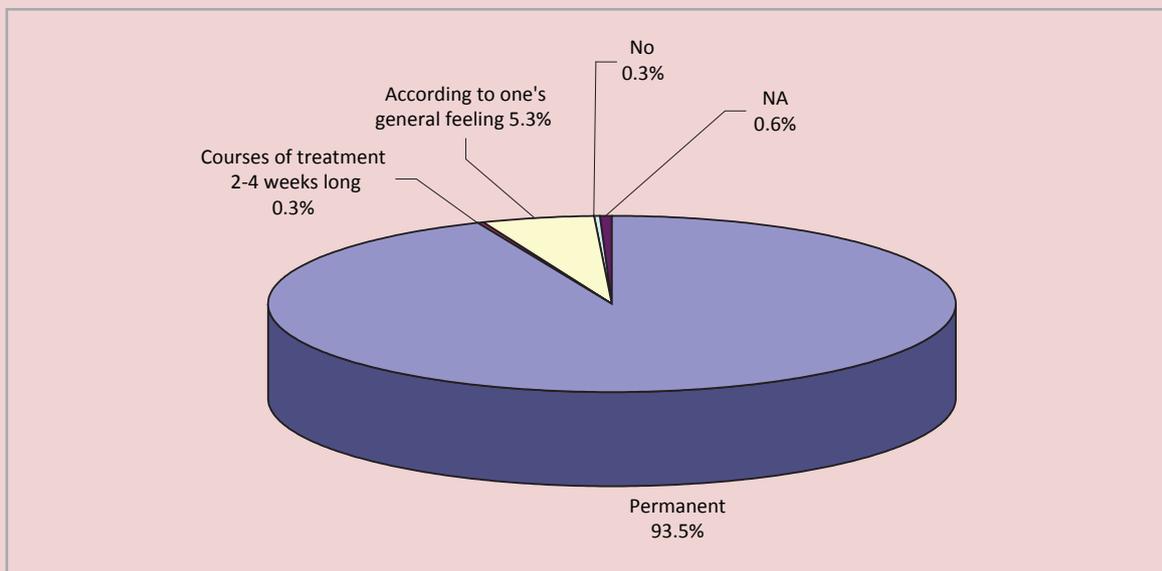


Figure 8. Proportion of patients by application of antihypertensive therapy with a single drug,%

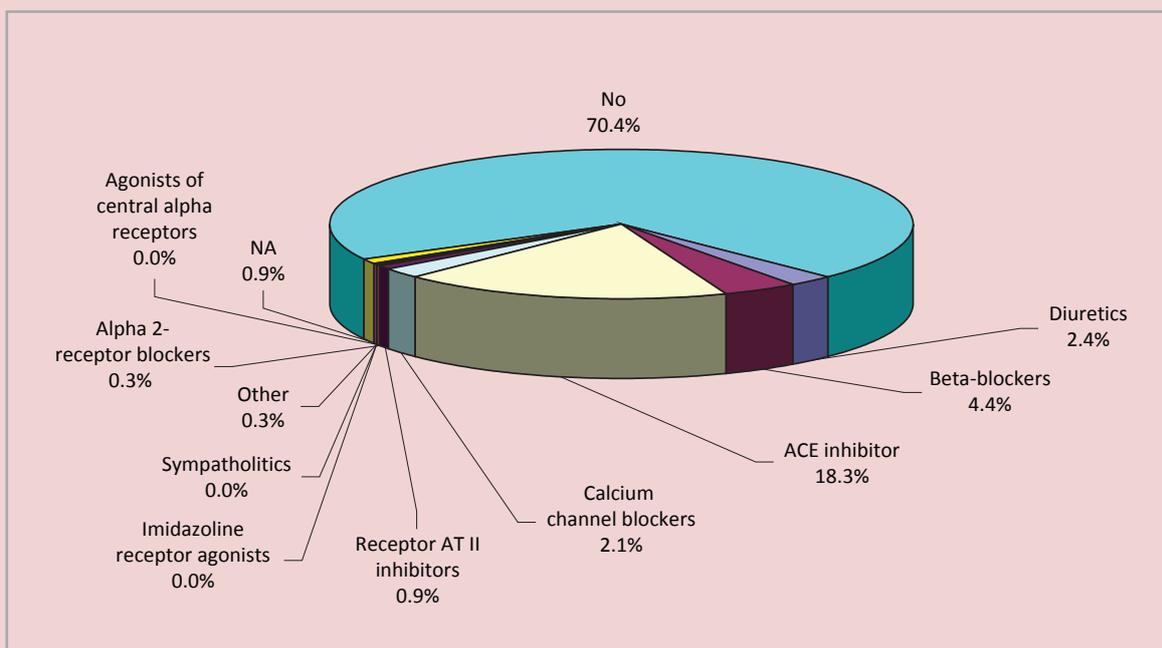


Figure 9. Proportion of patients who use combined antihypertensive therapy, %

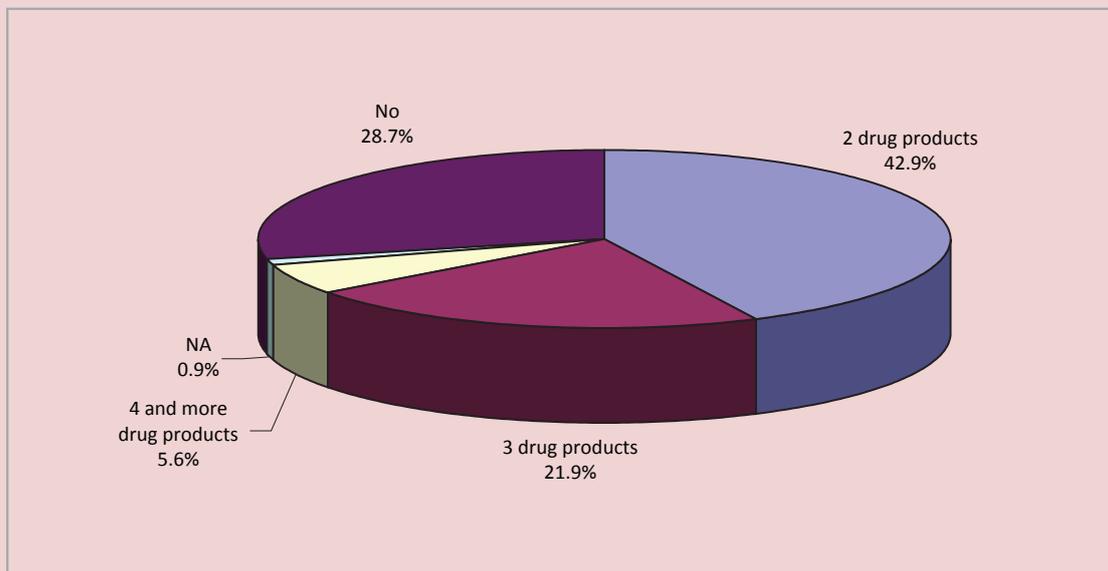


Figure 10. Distribution of patients by achievement of the target level of blood pressure, %

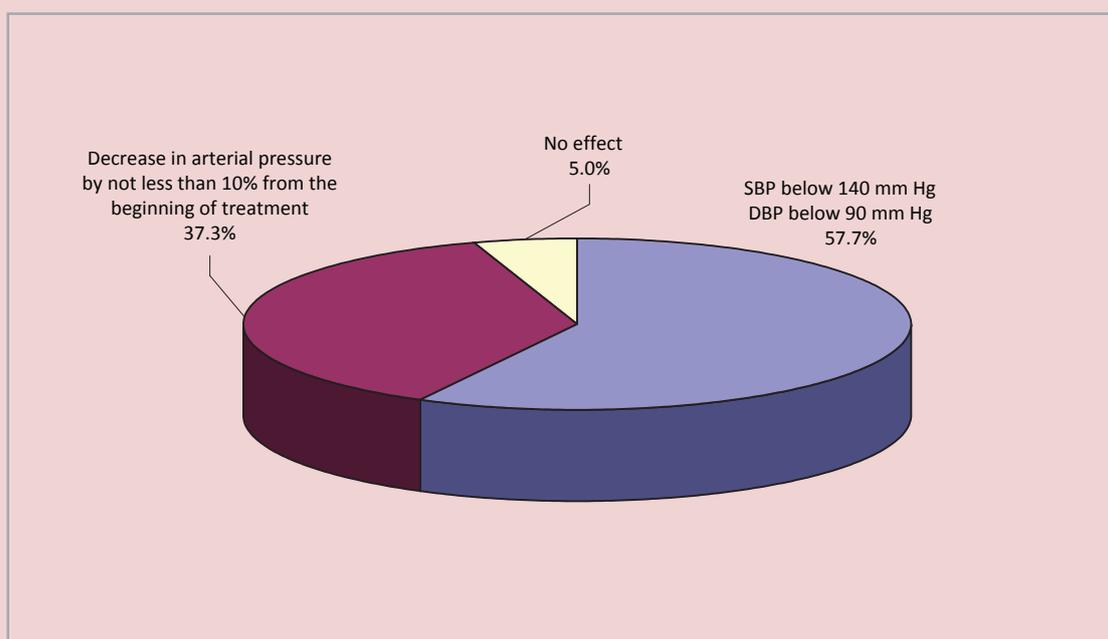


Table 1. Impact of major risk factors in patients with arterial hypertension

Types of reduction of influence	Major risk factors					
	Physical activity (30 minutes daily), %, number of questionnaires	Normalization of blood sugar, %, number of questionnaires	Weight loss under impaired fat metabolism, %, number of questionnaires	Smoking cessation, % number of questionnaires	Normalization of lipid metabolism, %, number of questionnaires	Consumption of not more than 120–150 ml of alcohol a week, or total abstinence, %, number of questionnaires
There is a decrease in the impact	49.7% (168)	21% (71)	27.2% (92)	23.1% (78)	24% (81)	14.8% (50)
There is no decrease in the impact	50.3% (170)	79% (267)	72.8% (246)	76.9% (260)	76% (257)	85.2% (288)

Table 2. Evaluation of the effectiveness of prophylactic medical examination of patients with arterial hypertension

Group of patients by integral effectiveness of treatment	%, number of questionnaires	Assessment of effectiveness
5-15 points	0,89% (3)	Treatment is not effective
16-29 points	16,27% (55)	Effectiveness is insufficient
30-45 points	82,84% (280)	Treatment is sufficiently effective

Reduction in the influence of risk factors of AH is observed only in four patients out of 338 examined (1.18%).

The expert assessment records indicate that although 84.3% of the patients (285 questionnaires) were informed about non-drug therapy, it is not used sufficiently by the patients with AH.

The studies [28] show that effective non-drug therapy can reduce systolic blood pressure by 11 mm Hg and diastolic blood pressure – by 6.8 mm Hg. Self-preservation activity of the citizens should become socially attractive and beneficial for the society, and self-preservation behavior should become standard practice [7; 11; 27].

The results of the analysis of the sample by scoring the effectiveness of treatment of patients with arterial hypertension are

presented in *table 2*. As we can see from the table, 82.84% of the patients (280 questionnaires) receive effective antihypertensive therapy (30 points and more).

Thus, despite the implementation of the oblast target programs, the treatment still has a large reserve for identifying and reducing arterial hypertension risk factors in the early stages.

Economic losses due to health deterioration in the Vologda Oblast population caused by diseases of the circulatory system were estimated according to the methodology presented in [24, 25, 26].

The full calculation of economic costs is hindered. It requires the full consideration of numerous socio-economic factors and reliable statistical data over a long period of time.

Tables 3 and 4 give the estimated value of lost profit for 2009–2010 caused by diseases of the circulatory system, in connection with temporary disability and social insurance payments, disability pensions, and premature mortality of the working-age population.

The total value of lost profit is 1.5 billion rubles per year according to only these two indicators.

One of the main criteria of public health is the indicator of “years of potential life lost” (YPLL). According to the Territorial Office of the Federal State Statistics Service in the Vologda Oblast, life expectancy in 2004–2009 ranged from 62.8 to 67.3 years with a mean of 65.42 years (73.22 years in

women and 58.6 years in men). The World Health Organization (WHO) recommends to consider the basic level of life expectancy to be 65 years.

The results of calculating YPLL for the Vologda Oblast in 2010 according to the methodologies [17, 26] are presented in table 5.

The table shows that in 2010, due to premature mortality in the working-age population, the oblast lost 110562 years of potential life and, therefore, a significant amount of gross regional product.

Environmental factors contribute to the indifferent attitude of citizens to their own health status. The Federal Law of the Russian Federation of November 21, 2011 No,

Table 3. Profit lost due to temporary disability caused by diseases of the circulatory system (the Vologda Oblast)\*

Indicator	2009	2010
Number of days of temporary disability due to diseases of the circulatory system	534360	485840
Average nominal monthly accrued wages of those employed in the economy, rub.	16566	18536
Average payment per day	552	618
Cost of one day by social insurance, rub.	276.10	308.93
Lost profit per year, million rub.	442.5	450.2
* Calculated using the following data: Osnovnye pokazateli deyatelnosti uchrezhdenii zdravookhraneniya Vologodskoi oblasti za 2010 god [Key Performance Indicators of the Health Institutions of the Vologda Oblast for 2010]. Vologda: Department of Health Care, 2011; and the data provided by the Territorial Office of the Federal State Statistics Service in the Vologda Oblast.		

Table 4. Profit lost in GRP production due to the reduction in the number of people employed in the economy due to premature mortality in the working-age population from diseases of the circulatory system\*

Indicator	2009
Mortality of the population aged 15–59. Diseases of the circulatory system	6221.2
Gross regional product at current basic prices per capita, rubles	176179.00
Lost profit in the production of GRP per year, million rubles (diseases of the circulatory system)	1096.045
* Calculated using the following data: <i>Demograficheskii ezhegodnik Vologodskoi oblasti</i> [Demographic Yearbook of the Vologda Oblast]. Vologda: Rosstat, 2011; and the data provided by the Territorial Office of the Federal State Statistics Service in the Vologda Oblast.	

Table 5. Years of potential life lost due to premature mortality of the working-age population in 2010\*

Age groups	Oblast		City/Town		Village	
	Men	Women	Men	Women	Men	Women
15-19	2064	384	1008	288	1056	96
20-24	6192	1419	3569	903	2623	516
25-29	8094	2394	4902	1596	3192	798
30-34	10131	2772	6699	1848	3432	924
35-39	10192	3304	6692	2212	3500	1092
40-44	11178	2990	7268	1840	3910	1150
45-49	14292	4410	8478	2700	5814	1710
50-54	15067	4407	8736	2600	6331	1807
55-59	11272		6960		4312	
Total YPLL	88482	22080	54312	13987	34170	8093
Disparity	4.01		3.88		4.22	

\* Calculated using the following data: *Demograficheskiy ezhegodnik Vologodskoi oblasti* [Demographic Yearbook of the Vologda Oblast]. Vologda: Rosstat, 2011

323-FL “About the fundamentals of health protection of the citizens in the Russian Federation” in article 27 “Duties of citizens in the sphere of health protection” in item 1 states: “The citizens have a duty to care for the preservation of their health. It is necessary to change the social paradigm, to introduce the system of health protection and to develop the culture of healthy lifestyle. The further improvement of the regulatory framework will

help motivate the conscious responsibility of each member of the society for their own health”.

Adjustment of risk factors in the development of DCS, effective non-drug therapy and self-preservation behavior of the population are essential for reducing premature mortality that impedes economic modernization, decreases productivity and hampers Russia’s sustainable development.

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