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## Study of adherence to therapy in patients with arterial hypertension and comorbidity

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### ABSTRACT

*The aim of the research* is to study the parameters of tolerance and adherence to antihypertensive therapy in patients with arterial hypertension and comorbidity in real clinical practice. *Material and methods.* The study included 138 adult patients (29% of men and 71% of women) with arterial hypertension and comorbidity receiving therapy in the cardiology department. The average age of the patients was  $64.3 \pm 12$  years. *Results.* The mean Charlson index in our study was  $3.97 \pm 2.0$  points ( $3.75 \pm 2.3$  points for men and  $4 \pm 1.9$  points for women). Treatment adherence was low in 40% of men and 24.5% of women. The lowest rates of adherence were found to medical follow-up (85% in men and 83.6% in women) and lifestyle modifications (80% in men and 77.5% in women), the highest rates of adherence were to drug therapy (20 % for men and 18.4% for women). Significant correlations were found for all adherence categories with age and the number of drugs taken.

*Conclusion.* Adherence to treatment in almost a third of the patients we surveyed was low. The lowest rates of adherence were found to medical support and lifestyle modifications, the highest were found to drug therapy. The factors influencing adherence, efficacy and tolerability of treatment includes age and the number of drugs taken.

KEY WORDS: adherence to therapy; arterial hypertension; cardiovascular diseases; comorbidity.

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## Estudio de adherencia al tratamiento en pacientes con hipertensión arterial y comorbilidad

### RESUMEN

El objetivo de la investigación es estudiar los parámetros de tolerancia y adherencia a la terapia antihipertensiva en pacientes con hipertensión arterial y comorbilidad en la práctica clínica real. Material y métodos. El estudio incluyó a 138 pacientes adultos (29% de hombres y 71% de mujeres) con hipertensión arterial y comorbilidad que recibían terapia en el departamento de cardiología. La edad media de los pacientes fue de  $64,3 \pm 12$  años. Resultados. El índice de Charlson medio en nuestro estudio fue de  $3,97 \pm 2,0$  puntos ( $3,75 \pm 2,3$  puntos para los hombres y  $4 \pm 1,9$  puntos para las mujeres). La adherencia al tratamiento fue baja en el 40% de los hombres y en el 24,5% de las mujeres. Las tasas más bajas de adherencia se encontraron al seguimiento médico (85% en hombres y 83,6% en mujeres) y modificaciones del estilo de vida (80% en hombres y 77,5% en mujeres), las tasas más altas de adherencia fueron a la farmacoterapia (20% para hombres y 18,4% para mujeres). Se encontraron correlaciones significativas para todas las categorías de adherencia con la edad y el número de fármacos consumidos. Conclusión. La adherencia al tratamiento en casi un tercio de los pacientes que encuestamos fue baja. Se encontraron las tasas más bajas de adherencia al apoyo médico y las modificaciones del estilo de vida, y las más altas a la terapia con medicamentos. Los factores que influyen en la adherencia, la eficacia y la tolerabilidad del tratamiento incluyen la edad y el número de fármacos que se toman.

**PALABRAS CLAVE:** adherencia a la terapia; hipertensión arterial; enfermedades cardiovasculares; comorbilidad.

### Introduction

Arterial hypertension is a leading risk factor for the development of cardiovascular (myocardial infarction, stroke, coronary heart disease, chronic heart failure), cerebrovascular (ischemic or hemorrhagic stroke, transient ischemic attack) and renal (chronic kidney disease) diseases as well as the main factor of premature death and the cause of about 10 million deaths and more than 200 million cases of disability in the world (Chazova and Zhernakova, 2019; Franklin et al., 2009; Williams et al., 2018). A distinctive feature of arterial hypertension is the high frequency of comorbidity, which leads to mutual influence on the course of the disease, determines the nature and severity of complications, complicates diagnosis and therapy. Despite the large number of antihypertensive drugs used, blood

pressure control remains an urgent task today. Researchers believe that one of the reasons for poor blood pressure control in hypertensive patients is their low adherence to therapy (Khokhlov et al., 2003; Chowdhury et al., 2013). Adherence to treatment in patients with CVD is one of the most important factors that ensure the quality of therapy and directly affect the prognosis (Ho et al., 2009; Martsevich et al., 2017). Adherence to treatment is commonly understood to mean the degree of compliance of the patient's behavior with respect to the recommendations received from the doctor in relation to drug therapy, adherence to diet, lifestyle changes and other components of disease control (National recommendations of the Russian Scientific Medical Society of Physicians for the quantitative assessment of adherence to treatment, 2017).

Low adherence to therapy for any disease reduces the effectiveness and increases the cost of treatment, increases the risk of complications, worsens the prognosis of the disease and life (Lukina et al., 2017). The most vulnerable in terms of poor adherence to treatment are patients with chronic diseases that are asymptomatic or asymptomatic and require long-term therapy. So, according to experts, long-term adherence to therapy regardless of the disease is no more than 50%, and 43-78% in chronic diseases (Osterberg and Blaschke, 2005).

According to the WHO classification, more than 250 factors are identified, combined into 5 groups, affecting patient compliance with medical recommendations. These are factors associated with patients, factors associated with doctors and the organization of the health care system, factors of drug therapy, factors of disease and a group of socio-economic factors (World Health Organization, 2003). The most well-studied group of factors associated with patients. However, in the results of numerous studies, there is no uniformity of data on this issue (Khokhlov et al., 2003; Martsevich et al., Lukina et al., Osterberg and Blaschke, 2005). Thus, a deeper and more versatile study of the adherence of hypertensive patients to therapy is of scientific and practical interest.

**The purpose of the research** is to study the parameters of tolerance and adherence to antihypertensive therapy in patients with arterial hypertension and comorbidity in real clinical practice.

## 1. Material and methods

The study was carried out in the cardiology department of the State Budgetary Healthcare Institution "City Clinical Hospital No. 1". The study included 138 patients (29% men and 71% women). The age of the surveyed was  $64.3 \pm 12.0$  years ( $61.5 \pm 14.0$  years for men and  $65.4 \pm 11.0$  years for women). Inclusion criteria: age over 18 years old, diagnoses of arterial hypertension established in the framework of standard clinical practice (with blood pressure at the visit more than 140/90 or 140/85 mm Hg in patients with diabetes mellitus), undergoing therapy in the cardiology department, the presence of comorbidity (obesity, diabetes mellitus, chronic obstructive pulmonary disease, coronary heart disease, chronic heart failure, cerebrovascular disease, chronic kidney disease etc.) and lack of exclusion criteria - patient's disagreement to participate in the study.

The survey included, in addition to general clinical studies in accordance with current clinical guidelines and standards for managing patients with arterial hypertension (Chazova and Zhernakova, 2019), a survey to quantify adherence to treatment according to a questionnaire developed by experts from the Russian Scientific Medical Society of Physicians (National recommendations of the Russian Scientific Medical Society of Physicians for the quantitative assessment of adherence to treatment, 2017).

The questionnaire is a questionnaire completed by the respondent (either independently or with the participation of an interviewer), which includes 25 multiple choice questions, a data processing algorithm (with an electronic application for automated data processing) and a list of clinical recommendations for a doctor and patient corresponding to the identified level of adherence in the main clinically significant categories (drug therapy; medical follow-up; lifestyle modifications). For all adherence indicators, the level of values in the range of up to 50% is interpreted as "low", from 51% to 75% as "average", more than 75% as "high" (National recommendations of the Russian Scientific Medical Society of Physicians for the quantitative assessment of adherence to treatment, 2017). To assess comorbidity, the Charlson index was used, which is a scoring system for assessing age and the presence of certain concomitant diseases. When calculating it, the points corresponding to concomitant diseases are summed up (Oganov et al., 2017).

Statistical analysis of the research results was carried out using Microsoft Excel 2019. The analysis results are presented as the mean and its standard deviation for continuous variables and as a percentage (in percent) for categorical variables. The critical level of

significance when testing statistical hypotheses was taken as  $p < 0.05$ . Evaluation of the linear relationship (association) between qualitative characteristics was carried out using correlation analysis.

## 2. Research results

The structure of comorbidity of the patients with arterial hypertension examined by us is presented in Table 1.

Table 1. The structure of comorbidity in patients with arterial hypertension

The number of comorbidities	Total		Women		Men	
	n	%	n	%	n	%
1	10	7	6	6	4	10
2	38	28	24	24	14	35
3	20	14	16	16	4	10
4	32	23	26	26	6	15
5	16	11	12	12	4	10
6	10	7	6	6	4	10
7	14	10	10	10	4	10

Of practical interest is the high prevalence of overweight (45% of men, 20% of women) and obesity (55% of men and 65% of women) revealed in the examined patients with arterial hypertension. Moreover, abdominal obesity was detected in 87% of patients (80% of men and 89% of women). Along with obesity, chronic obstructive pulmonary disease (17.4%) and diabetes mellitus (5.8%) were most often recorded in patients with arterial hypertension. Of the patients examined by us, 33.3% had a CVD-burdened heredity, 7.3% continued to smoke even after the development of the disease.

Proceeding from the fact that comorbid diseases in patients with arterial hypertension may indirectly affect adherence to therapy by increasing the number of drugs recommended for patients, we investigated the structure of comorbid pathology. The distribution of hypertensive patients according to the comorbidity index is presented in Table 2.

Table 2. Distribution of patients with arterial hypertension by comorbidity index

Charlson Index (points)	Total		Women		Men	
	n	%	n	%	n	%
1	16	11,6	10	10	6	15
2	12	8,7	10	10	2	5
3	28	20,3	18	18	10	25
4	28	20,3	22	22	6	15
5	22	15,9	18	18	4	10
6	14	10,1	12	12	2	15
7	12	8,7	8	8	4	10
8	2	1,5	2	2	0	0
9	2	1,5	0	0	2	5

The average value of the Charlson index of the patients examined by us was  $3.97 \pm 2.0$  points ( $3.75 \pm 2.3$  points in men and  $4 \pm 1.9$  points in women), which makes it possible to predict the 10-year survival rate of only 53% of the examined and is a poor prognostic criterion.

The average values of adherence to the implementation of medical recommendations of the examined patients with arterial hypertension and comorbidity are presented in Table 3.

Table 3. Average values of adherence to treatment in patients with arterial hypertension and comorbidity ( $M \pm \delta$ )

Commitment categories, points	All patients (n = 138)	Men (n = 40)	Women (n = 98)
Adherence to drug therapy	71,2±17,2	70,5±20,5	71,5±16,0
Commitment to medical support	41,4±13,7	38,0±16,8	42,9±12,2
Commitment to lifestyle modification	44,1±10,4	42,0±12,9	44,9±9,2
Treatment adherence	56,7±12,0	55,3±16,4	57,1±9,9

Adherence to drug therapy in our study was high in 50% of men and 38.8% of women, medium - in 30% of men and 42.8% of women, low - in 20% of men and 18.4% of women. Adherence to medical care was high in 10% of men and 2% of women, moderate in 5% of men and 14.3% of women, low in 85% of men and 83.6% of women. Adherence to lifestyle modification reached the average level in 20% of men and 22.4% of women, low - in 80% of men and 77.5% of women. The resulting indicator is adherence to treatment, which was high only in 5% of men and 2% of women, medium - in 55% of men and 73.5% of women, low - in 40% of men and 24.5% of women (Figure 1).

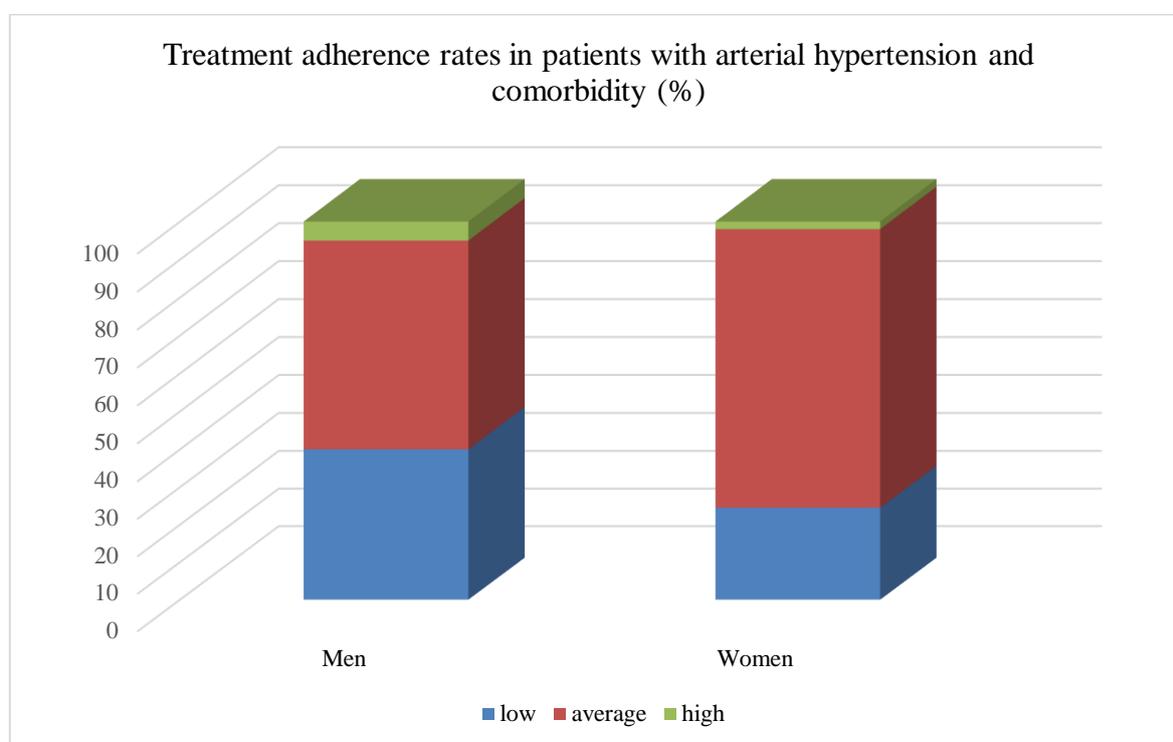


Figure 1. Levels of adherence to treatment in patients with arterial hypertension and comorbidity (%)

Of practical interest is the fact that 33.3% of the patients we interviewed (40% of men and 30.6% of women) took medications only during the period of hospitalization. The incidence of low adherence to medical recommendations was more pronounced in men and turned out to be the highest in the categories of adherence to medical care and lifestyle modification (Fig. 2).

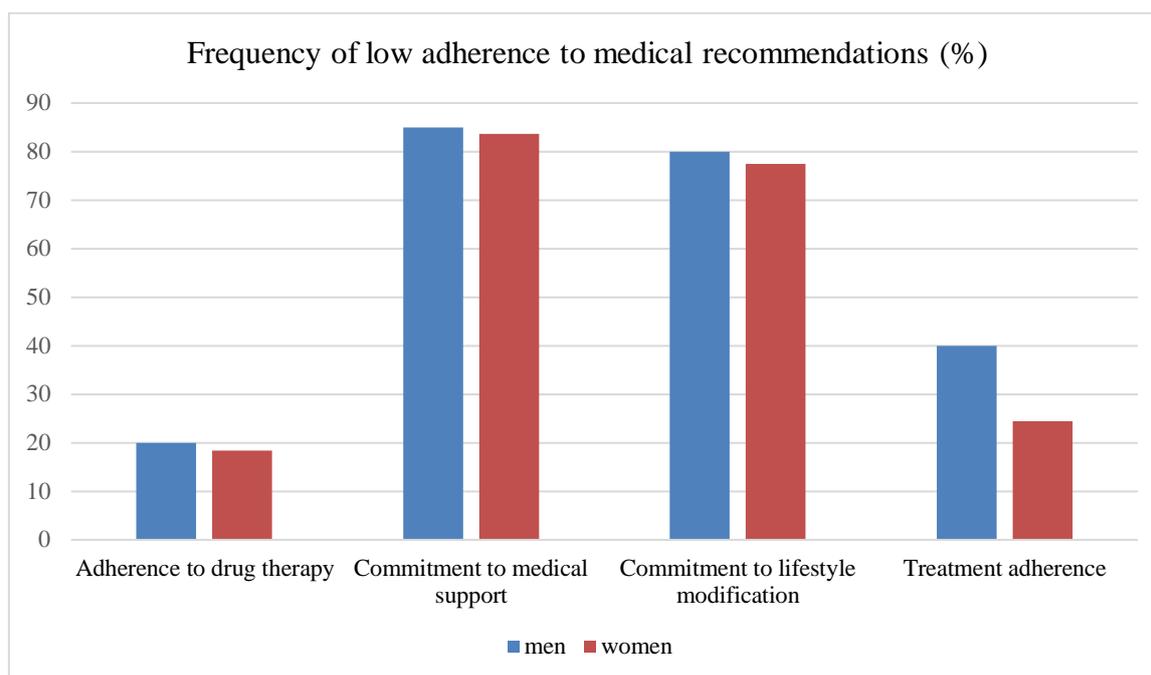


Figure 2. Frequency of low adherence to medical recommendations in patients with arterial hypertension and comorbidity (%)

Thus, the group of patients examined by us was characterized by a high comorbidity index and unsatisfactory adherence to treatment. The methodology used to quantify adherence to treatment (National recommendations of the Russian Scientific Medical Society of Physicians for the quantitative assessment of adherence to treatment, 2017) allows us to manage therapy taking into account the identified levels of adherence in a particular patient. This approach will help to achieve the maximum possible result of medical interventions. Based on this, it is possible to recommend the introduction of a questionnaire to quantify adherence to treatment into the practice of managing patients with hypertension and comorbidity. To increase the effectiveness and adherence to treatment, it is necessary to systematically work with patients, taking into account their level of adherence.

Correlation analysis revealed statistically significant negative associations of weak strength between the number of drugs used and adherence to treatment ( $r = -0.11$ ,  $p < 0.0001$ ), mainly due to adherence to drug therapy ( $r = -0.12$ ,  $p < 0.0001$ ) and medical support ( $r = -0.23$ ,  $p < 0.0001$ ). Multidirectional correlations were obtained between age and individual categories of adherence to treatment: negative - between age and adherence to drug therapy ( $r = -0.21$ ,  $p < 0.001$ ), between age and adherence to medical care ( $r = -0.27$ ,  $p < 0.0001$ ) and positive - between age and commitment to lifestyle modification ( $r = 0.18$ ,  $p < 0.0001$ ).

## Conclusion

Adherence to treatment in almost a third of the patients we surveyed was low. The lowest rates of adherence were found to medical support and lifestyle modifications, the highest were found to drug therapy. According to the results of our study, the factors influencing adherence, efficacy and tolerability of treatment includes age and the number of drugs taken. To increase the effectiveness and adherence to treatment, it is necessary to systematically work with patients, taking into account their level of adherence. The introduction into the practice of managing patients with arterial hypertension and comorbidity of the questionnaire to quantify adherence to treatment will increase the adherence of patients to the implementation of medical recommendations.

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