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Original Article

Adherence-related challenges and drug utilization in hypertension management

Viktor Meretskyi [1]*, Iryna Meretska [2]

[1] Department of Internal Medicine, Luhansk State Medical University, Rivne, Ukraine

[2] Institute of Health Protection, National University of Water and Environmental Engineering, Rivne, Ukraine

* Correspondence to: Professor Viktor Meretskyi, Department of Internal Medicine, Luhansk State Medical University, 16 Lypnia str. 36, Rivne, 33028, Ukraine. Phone: +38 0689983652; E-mail: v.m.meretskyi@lsmu.ukr.education

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Abstract

Arterial hypertension is a major contributor to cardiovascular morbidity and mortality, with poor adherence to treatment remaining a key issue. This study aimed to evaluate medication use, adherence levels, and factors influencing compliance among patients with hypertension, as well as the role of pharmaceutical care in improving outcomes. A cross-sectional survey was conducted among 200 hypertensive outpatients using a structured questionnaire that assessed sociodemographic, clinical, and pharmacotherapeutic data. Adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8). Hypertension was more prevalent among married, employed individuals with higher education. Modifiable risk factors included smoking (40%), alcohol use (36.7%), low physical activity (66.7%), and high salt intake (53.3%). Common comorbidities included hypercholesterolemia, diabetes, and cardiovascular or cerebrovascular diseases. All patients received combination therapy, with diuretics being the most prescribed (96.7%). Only 10% showed high adherence, while over half had low adherence. Key barriers were treatment cost, reliance on phytotherapy, and irregular medication use. Participation in the national "Affordable Medicines" program was reported by 80% of respondents. Adherence to antihypertensive therapy remains low and is affected by both clinical and socioeconomic factors. Enhancing pharmaceutical care and ensuring access to affordable medications are vital to improving treatment compliance and achieving better blood pressure control.

Keywords: adherence, antihypertensive therapy, risk factors, comorbidities

Introduction

Arterial hypertension, which is considered a "disease of civilization", ranks first in prevalence among cardiovascular diseases. Studying hypertension (HTN) is crucial for public health, enhancing patient outcomes, and achieving global health objectives. Hypertension affects approximately 40% of the world's population aged 25 years or older. Arterial hypertension follows the so-called "rule of halves": around 50% of individuals with elevated blood pressure are unaware of their condition due to its often asymptomatic nature. Of those diagnosed, only half receive antihypertensive therapy [1]. Hypertension is one of the primary contributors to premature mortality globally and is associated with an increased risk of kidney disease, cardiovascular disease, and stroke. Adherence to HTN therapy refers to the extent to which a person's behavior, including taking medication, following a diet, and implementing lifestyle changes, aligns with the recommendations provided by a healthcare provider. For patients with hypertension, adherence to therapy is 50–60%, i.e., taking only half of the prescribed antihypertensive medications and following part of the lifestyle modification recommendations. Some patients, especially those with newly diagnosed HTN, stop taking medications within a year. Patients who regularly take medications designed to lower BP have a better chance of achieving therapy goals and preventing complications of arterial hypertension [2, 3].

The study aims to analyze the use of antihypertensive drugs, identify key factors affecting patient adherence

to antihypertensive therapy, and assess the role of pharmaceutical care in ensuring rational pharmacotherapy in arterial hypertension.

Material and methods

Study design and patients

The study involved a survey of 200 outpatients with arterial hypertension to collect empirical data relevant to the research aims. All patients were assessed using a structured questionnaire developed for the study, which included sections on personal, sociodemographic, clinical, and pharmacotherapeutic data, as well as components related to adherence to therapy, given that adherence is a key principle in the management of arterial hypertension. The level of treatment adherence was evaluated using the 8-item Morisky Medication Adherence Scale (MMAS-8), which consists of questions assessing patients' behaviors and attitudes toward taking their prescribed medication. According to the scoring system, a total score of 8 indicates high adherence, scores from 6 to <8 indicate medium adherence, and scores below 6 indicate low adherence [4].

Statistical analysis

Data were statistically analyzed using MS Excel for Windows, employing clinical, descriptive, and inferential statistical methods. Descriptive statistics were presented as frequencies, percentages, and means with standard deviations (mean±SD).

Results

The study included patients aged 44 to 70. The mean age of patients with hypertension was 54.67±1.23 years. Among those surveyed, the number of men and women was equal. It should be noted that women tend to develop hypertension at a younger age, usually in the premenopausal period (40–45 years). When analyzing patients by disease duration, it was found that patients with a long course of the disease were prevalent among the respondents: a duration of 5 to 10 years and more than 10 years was observed in 50% and 47% of patients, respectively. All patients were married. According to the survey, the distribution of patients by education was as follows: those with higher education – 53.3%, those with secondary education – 20%, and those with specialized secondary education – 26.7%. It was found that the majority of patients (70%) were employed. Thus, arterial hypertension was most frequently observed in married and employed individuals with higher education.

Nicotine and smoke components increase blood pressure, impair vascular elasticity, disrupt blood viscosity, and accelerate heart rate, among other effects. At the same blood pressure levels, stroke and ischemic heart disease occur 2–3 times more often in smokers than in non-smokers. Among the patients we surveyed, the proportion of smokers was 40%.

Alcohol consumption, both occasional and chronic, can affect blood pressure levels. Among those surveyed, 36.7% drink alcohol.

There is a direct correlation between weight gain and an increase in both systolic and diastolic blood pressure. Excess body weight, especially obesity, increases the risk of developing hypertension by 2 to 6 times compared to people with normal body weight. Overweight was observed in 16.7% of respondents.

Excessive consumption of table salt can affect sodium levels in the body, leading to fluid retention and increased blood volume, which in turn increases the load on the heart and arterioles and may contribute to the development of hypertension and other cardiovascular diseases. Based on the survey results, 53.3% of respondents reported regular consumption of salty food, 20% indicated that they do not consume salty food, and 26.7% stated that they consume it occasionally.

Heredity is a significant etiological factor in the development of arterial hypertension and substantially increases the risk of its onset. Among the surveyed patients, 30% reported a family history of arterial hypertension. This finding underscores the role of genetic predisposition in the development of the condition and aligns with existing literature emphasizing heredity as a key risk factor in hypertension pathogenesis.

Physical activity is a critical modifiable factor influencing the risk of arterial hypertension. Individuals with a sedentary lifestyle exhibit a markedly increased risk—estimated to be 20–50% higher—of developing hypertension compared to those who engage in regular physical activity. Analysis of lifestyle factors revealed that 33.3% of the surveyed patients reported engaging in regular physical activity. This finding highlights a relatively low prevalence of health-promoting behaviors within the study population and may have implications for hypertension risk management.

The presence of comorbidities plays a critical role in the clinical course and management of arterial hypertension, as it contributes to increased cardiovascular

risk, complicates treatment strategies, and influences overall prognosis. Elevated cholesterol levels are a significant risk factor for impairing vascular function and contributing to increased blood pressure. An elevated cholesterol level was observed in 38.1% of the surveyed patients with hypertension. The coexistence of hypertension and diabetes significantly increases the risk of cerebrovascular accidents, nephropathy, and diabetic retinopathy. Effective glycemic control is essential in hypertensive patients with diabetes to prevent target organ damage and improve clinical outcomes. Diabetes mellitus (DM) was observed in 19.1% of examined patients with hypertension. Arterial hypertension, even in its mild form, is associated with an increased risk of coronary heart disease (CHD) and myocardial infarction. In individuals aged 30 to 60 years with diastolic blood pressure exceeding 100 mmHg, the incidence of myocardial infarction is three times higher compared to those with normotensive values. In our surveyed population, coronary heart disease was diagnosed in 9.5% of patients. Arterial hypertension is recognized as the leading risk factor for the development of cognitive impairment. Even in the early stages of hypertension, cerebral blood flow may be reduced, which can be further exacerbated by the occurrence of ischemic strokes, intracerebral hemorrhages, and other cerebrovascular complications. Previous cerebrovascular events were documented in 14.2% of the surveyed patients.

According to current evidence, effective pharmacological treatment of hypertension not only ensures adequate blood pressure control but also plays a critical role in enhancing cardiovascular function and significantly lowering all-cause and cardiovascular mortality rates. All participants included in the study were prescribed combination antihypertensive therapy, consisting of two or more agents from different pharmacological classes, in order to achieve target blood pressure control. Diuretics were administered to nearly all patients (96.7%). Angiotensin-converting enzyme inhibitors (ACEIs) were prescribed to 43.3% of the respondents, while approximately one-third of patients received long-acting dihydropyridine calcium channel blockers. Beta-adrenergic blockers and angiotensin II receptor blockers (ARBs) were the least frequently used, prescribed in 20% and 13.3% of patients, respectively. Among the most frequently used combinations, the concomitant administration of ACE inhibitors and diuretics was observed in 43.3% of patients. The advantages of this combination include the potentiation of the antihypertensive effect of ACE inhibitors by diuretics, simplification of the medication regimen, and improved adherence to long-term hypertension treatment. Dihydropyridine calcium channel blockers combined with diuretics were prescribed to 33.3% of patients, representing a cornerstone combination in antihypertensive therapy. Additionally, 20% of patients received beta-blockers in combination with diuretics, a regimen known to reduce the incidence of ischemic heart disease and cardiovascular mortality.

Adherence to prescribed medication regimens is a critical factor in the effective control and management of hypertension. Analysis of the obtained data showed that only 33.3% of patients adhered to their medication regimen with 100% regularity, 50% of patients demonstrated 75% adherence, and 16.7% of patients took their prescribed medications regularly in only 50% of cases.

Regular blood pressure monitoring is a crucial component in managing arterial hypertension and maintaining cardiovascular health. Among the surveyed patients, 73.3% regularly monitor their blood pressure, while 23.4% do so occasionally. In 3.3% of patients, blood pressure remains uncontrolled.

Long-term pharmacotherapy is a critical component in the management of arterial hypertension. Many antihypertensive medications require consistent administration over extended periods to achieve optimal therapeutic efficacy. Timely and accurate intake of prescribed doses is essential for maintaining stable blood pressure control and preventing complications. Among the surveyed patients, 90% demonstrated a positive attitude towards long-term medication adherence, while 10% expressed doubts regarding the necessity of prolonged treatment.

The patients were classified according to the level of adherence to all medical prescriptions and recommendations for arterial hypertension. Among the surveyed patients, one-third (30%) reported taking all prescribed antihypertensive medications. Additionally, 23.4% considered the cost of treatment to be high, 16.7% preferred herbal remedies, 13.3% followed a “tablet-saving” strategy, 10% admitted to forgetting to take their medications regularly, 3.3% believed that medication was unnecessary due to the lack of symptoms from elevated blood pressure, and another 3.3% reported experiencing side effects such as dizziness and nausea from the prescribed drugs.

According to the assessment based on the 8-item Morisky-Green scale, high adherence to antihypertensive therapy was identified in 10% of patients, moderate adherence in 33.3%, and low adherence in 56.7%.

The findings suggest that better financial accessibility to medications positively impacts adherence to

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antihypertensive therapy. In particular, patients who benefited from the "Affordable Medicines" program, which provides essential drugs at no cost or with minimal payment, demonstrated higher adherence rates. This supports the importance of state-supported pharmaceutical programs in reducing economic barriers, improving treatment outcomes, and preventing complications related to hypertension. Eighty percent of patients reported using the "Affordable Medicines" program. Additionally, 26.7% of patients had asked their physician to replace expensive medications with more affordable and accessible alternatives.

Discussion

Arterial hypertension remains one of the most significant medical and social challenges of modern healthcare. Its importance lies in its role as a major risk factor for the development of other cardiovascular diseases, including stroke, myocardial infarction, heart failure, and arrhythmias. Treatment adherence in patients with hypertension is a critical determinant of overall therapeutic effectiveness and long-term outcomes [3, 5].

Lifestyle modification plays a pivotal role in managing arterial hypertension. Excessive salt intake is a key contributor: 53.3% of respondents reported regular consumption of salty foods, and 26.7% occasional use. Scientific evidence emphasizes reducing sodium intake to <6 g of salt (≈2.3 g sodium) per day, as even modest reductions can significantly lower blood pressure in both normotensive and hypertensive individuals. The WHO and other leading guidelines advocate achieving a 30% reduction in population salt intake by 2025, recommending low-sodium, high-potassium salt substitutes as feasible interventions [6].

Only 33.3% of respondents reported engaging in regular physical activity. International recommendations advise at least 150 minutes per week of moderate aerobic exercise—such routines can independently reduce blood pressure by approximately 5–7 mmHg.

Unhealthy habits remain prevalent: 40% of patients were smokers, while 36.7% consumed alcohol frequently. Clinical guidelines unequivocally advocate smoking cessation and moderation in alcohol intake to manage hypertension. Specifically, limiting alcohol to ≤2 standard drinks/day for men and ≤1 for women is associated with improved blood pressure control [2].

The study accounted for the presence of comorbid conditions. Among participants, 19.1% had diabetes mellitus, 9.5% had coronary heart disease, 14.2% had a history of cerebrovascular events, and 38.1% presented with elevated cholesterol levels. It is well-established that comorbidities such as CHD, DM, heart failure, hypercholesterolemia, and chronic kidney disease complicate reaching target blood pressure levels. These complexities arise due to the need for multiple antihypertensive agents, which may negatively affect treatment adherence, and necessitate the strategic selection of drug classes supported by evidence for specific comorbidities [7].

The antihypertensive therapy selected for the surveyed patients was appropriately tailored and in accordance with contemporary clinical practice guidelines for the management of arterial hypertension [3, 7].

Based on the results, 90% of patients demonstrated insufficient adherence to antihypertensive pharmacotherapy. Research has identified financial barriers as a consistent predictor of non-adherence—studies in low- and middle-income countries report that patients who face higher medication costs are significantly more likely to skip doses or ration pills [8, 9]. In our cohort, 23.4% of patients chose cheaper alternatives, and 13.3% rationed their tablets, echoing findings where high co-payments clearly undermine adherence. Moreover, 16.7% of participants reported using traditional or herbal remedies, a behavior that has been similarly linked in several studies to medication nonadherence. This trend aligns with evidence that patients using supplementary or alternative medicines are more likely to discontinue their prescribed antihypertensives [10].

Provision of targeted counseling and evidence-based interventions is essential to enhance medication adherence. A cohort study of older adults, for instance, found that patients with ≥80% adherence had a 56% lower risk of cardiovascular events compared to those with poor adherence [5], while non-adherence has been linked to significantly higher mortality and hospitalization rates in multiple large population studies [11].

International hypertension guidelines, such as those from the European Society of Cardiology/European Society of Hypertension (ESC/ESH) and the International Society of Hypertension (ISH), emphasize the importance of identifying and addressing non-adherence—particularly in cases of suspected resistant hypertension-and recommend simplified regimens, shared decision-making, and single-pill combinations to improve compliance [12]. Additionally, guidelines for heart failure (which frequently coexists with hypertension) reinforce the need for adherence to evidence-based therapies—including ACE inhibitors,

ARBs, and beta-blockers—to reduce hospitalizations and mortality.

Together, this body of evidence and guidance underscores that optimizing patient adherence—through educational interventions, financial accessibility (*e.g.*, affordable drug programs), and simplified treatment regimens—is crucial to maximizing clinical outcomes and reducing cardiovascular morbidity and mortality.

A multidisciplinary healthcare team, comprising physicians, pharmacists, nurses, and other allied health professionals, plays a critical role in improving adherence to antihypertensive therapy. Collaborative care models facilitate comprehensive patient support by integrating medical management with patient education, medication counseling, and behavioral interventions. Pharmacists contribute by optimizing pharmacotherapy and addressing adherence barriers, while nurses often assist with follow-up, lifestyle counseling, and monitoring. This team-based approach enhances continuity of care, fosters patient engagement, and has been shown to improve blood pressure control and long-term treatment adherence in patients with arterial hypertension.

Conclusions

Hypertension was predominantly observed among married, employed individuals with higher education. Key modifiable risk factors identified included smoking, alcohol consumption, excessive salt intake, overweight status, and low physical activity levels. A significant proportion of patients reported a positive family history of hypertension.

Comorbidities such as diabetes mellitus, ischemic heart disease, hypercholesterolemia, and prior cerebrovascular events were common and may adversely affect adherence to antihypertensive therapy due to increased treatment complexity and polypharmacy.

Diuretics were the most frequently prescribed antihypertensive agents. ACE inhibitors and long-acting dihydropyridine calcium channel blockers were also commonly used, often in combination with diuretics. The combinations of ACEIs with diuretics and calcium channel blockers with diuretics constituted the predominant therapeutic regimens.

Despite this, 66.7% of patients did not adhere to regular medication intake, although 73.3% performed regular blood pressure monitoring. While 90% of respondents expressed a positive attitude towards long-term pharmacotherapy, 10% remained uncertain about its necessity. According to the Morisky-Green scale, 90% of patients demonstrated insufficient adherence to antihypertensive treatment.

The main barriers to full adherence included high treatment costs (23.4%), preference for phytotherapy (16.7%), and "pill-saving" behavior (13.3%). Notably, 80% of patients utilized the "Affordable Medicines" program, and 26.7% requested substitution of costly medications with more affordable alternatives.

Multidisciplinary collaboration among healthcare professionals, including physicians, pharmacists, and nurses, is essential for improving adherence to antihypertensive therapy and ultimately achieving better blood pressure control and treatment outcomes.

Conflict of interest

The authors declare no conflict of interest.

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