



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203





Human Journals

Review Article

October 2022 Vol.:25, Issue:3

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The Current Scenario of Clinical Pharmacy Practice in the Management of Patients with Hypertension and Associated Complications: A Review

	
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Submitted: 23 September 2022	
Accepted: 28 September 2022	
Published: 30 October 2022	

Keywords: Hypertension; Clinical pharmacist; Medication adherence; Quality of life; cardiovascular diseases; Patient counselling; Rational drug therapy

ABSTRACT

The purpose of this study is to organise, analyse, and evaluate the role that clinical pharmacists play in improving medication adherence and quality of life in patients with hypertension, as well as to determine whether the level of management interventions provided by clinical pharmacists is effective in helping hypertensive patients to reach their therapeutic goals. Many studies have shown and confirmed the positive effects of clinical pharmacist intervention on the management of blood pressure, lipid profiles, aneurysm, stroke, dementia, heart failure and other complications, economic benefits, improving health-related quality of life, drug-related problems, adherence to medication, provision of patient education and counselling services, medication therapy management services, and other pharmaceutical care services that improve the clinical outcomes in patients with hypertension were better than those of basic treatment. In all cases, It was found that the intervention was effective in helping hypertensive patients reach their therapeutic goals and in lowering other disease-related problems. Therefore, integrating a clinical pharmacist to a medical team has proven to be successful in improving a number of clinical health outcomes for hypertensive patients. This may be useful in understanding how the role of the clinical pharmacist is developing for those who have hypertension and associated complications.



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INTRODUCTION

High blood pressure (hypertension) is a long-term medical condition in which the force of the blood against the artery walls is too high. Blood pressure above 140/90 is usually considered to be hypertension, and BP above 180/120 is considered to be have severe hypertension. that it may eventually result in health problems including heart disease.

The amount of blood heart pumps and the degree of resistance to blood flow in arteries both affect blood pressure. Blood pressure will increase as heart pumps more blood and as arteries become more constricted. Two or more systolic blood pressure readings of 130 mmHg or higher, or diastolic readings of 80 mmHg or higher, are considered to be signs of hypertension.¹ There are two basic type of hypertension primary and secondary hypertension:

- **Primary, or essential**, hypertension is the most common type of hypertension. For most people who get this kind of hypertension, it is gradually worsen with age.
- **Secondary hypertension results from the use of specific medications or another medical condition. Once the illness is treated or the medications causing it are stopped, it eventually gets better.**

Many patients with hypertension (HTN) remain undiagnosed in the early stages since the symptoms are often not noticeable. HTN complications such renal failure, myocardial infarction, heart failure, stroke, and early death are more frequent if it remains undiagnosed. Data regarding undiagnosed hypertension are lacking in hypertensive patients that contribute to the increased prevalence of hypertension propensity, such as excessive alcohol use, sedentary lifestyle, cigarette smoking, and poor diets that include eating too much junk food and salt.

Sometimes, high blood pressure has no symptoms. In addition to damaging the arteries, it raises the risk of stroke, heart attack, kidney failure, and blindness.

Signs and symptoms

majority of people with high blood pressure show no signs or symptoms, even when blood pressure readings reach excessively high levels. Some individuals with high blood pressure may experience headaches, dizziness, blurred vision, breathlessness, or nosebleeds, chest pain, swollen abdomen, fatigue and oedema shown in Fig 1. but these signs and symptoms

are general and typically don't appear until high blood pressure has reached a severe or life-threatening level.²

Risk factors

Many factors can cause high blood pressure shown in Fig 2, the following are some of the common factors:

- **Age:** The risk of hypertension increases with age; high blood pressure is more prevalent in men in the age group of 40-60 years. After the age of 45, women are more prone to have high blood pressure.
- **Family history:** The tendency for hypertension to run in families.
- **Race.** Individuals with African ancestry tend to have higher blood pressure than those with white people, and it frequently manifests earlier in life for them. People of African descent are also more likely to experience severe complications such a stroke, heart attack, or renal failure.
- **obesity or being overweight.** More blood is required to carry oxygen and nutrients to your tissues when body weight increases. The pressure on the artery walls rises in proportion to the amount of blood flowing through your blood vessels.
- **excessive dietary sodium (salt).** The body may retain fluid as a result of eating too much sodium, which will raise the blood pressure.
- **Overweight or obese:** More blood is required to carry oxygen and nutrients to the tissues when body weight increases. The pressure on the artery walls rises in proportion to the amount of blood flowing through the blood vessels.
- **Smoking or chewing tobacco.** While smoking or chewing tobacco temporarily raises blood pressure, the chemicals in tobacco can harm the lining of the artery walls. Coronary arteries may constrict as a result, raising the chance of developing heart disease.
- **Stress.** High stress levels might cause a temporary rise in blood pressure. Stress-related behaviours like eating more, smoking, or drinking alcohol can cause blood pressure to rise even more.

- Chronic illness. The chance of having high blood pressure may also be increased by some chronic illnesses, such as kidney disease, diabetes, and sleep apnoea etc.
- Inadequate potassium intake. The amount of sodium in the cells is balanced by potassium. For healthy hearts, a sufficient potassium balance is essential. Sodium can build up in the blood if consume inadequate amounts of potassium or lose too much of it as a result of dehydration or other medical issues.³

Blood Pressure Influencing Factors

Blood pressure is influenced by following factors:

- Cardiac output
- Peripheral vascular resistance
- the amount of blood in circulation
- Blood viscosity
- Vascular flexibility

Studies have shown that, in comparison to standard care, clinical pharmacists are more helpful in decreasing blood pressure, meeting BP targets, selecting evidence-based medicine, and enhancing patient satisfaction with care. Pharmacists have shown similar clinical benefit when focusing on the treatment of resistant hypertension. Patients with resistant hypertension who receive a pharmacist intervention experience lower BPs, a decrease in BP, urgent care visits, and hospitalizations.⁴

Clinical pharmacist interventions improve antihypertensive medication adherence and lower systolic and diastolic blood pressure. Clinical pharmacists can contribute to health promotion and education initiatives to improve blood pressure control.

Complications of Hypertension

High blood pressure can harm the blood vessels and organs since it put too much strain on the walls of the arteries. The harm increases when high blood pressure rises and remains uncontrolled for a longer period of time.

Uncontrolled blood pressure can lead to complications like:

- Stroke and a heart attack: High blood pressure can result in atherosclerosis, which thickens and hardens the arteries and increases the risk of heart attack, stroke and other consequences.
- Aneurysm: once blood arteries weakened and swell resulting in the formation of aneurysm, if aneurysm ruptures it may be fatal and life threatening.
- Heart failure: The heart needs to work harder to pump blood against the increased pressure in the veins as a result the walls of the heart's pumping chamber become thicker. Heart failure can result if the thickening muscle eventually struggles to pump enough blood to meet body's requirements.
- Memory or attention problems: Ones capacity for thought, memory, and learning may be hampered by uncontrolled high blood pressure. A higher percentage of patients with high blood pressure have memory or cognitive problems.⁵
- Dementia. A specific type of dementia may result from narrowed or clogged arteries that reduce blood supply to the brain (vascular dementia). Vascular dementia may also result from a stroke that disrupts blood flow to the brain.
- Metabolic disorder this syndrome is a collection of metabolic abnormalities in the body, including a bigger waist, higher triglyceride levels, lower HDL cholesterol (the "good" cholesterol), higher blood pressure, and higher insulin levels. Diabetes, heart disease, and stroke are all illnesses that increase your risk of developing them.
- Renal blood vessels that are weakened and constrict.as a result These organs may be unable to function normally.
- Ocular blood vessels that are enlarged, constricted, or torn. Loss of vision could be the outcome.⁶

Although hypertension is very common, it is still not well-controlled in India Clinical inertia, patients' restricted access to medical care, ignorance of or underestimating of the significance of lifestyle factors, and nonadherence to blood pressure (BP)-lowering medicine are a few of

the causes. For improving hypertension control rate should be multilevel. One creative strategy for improving hypertension care is team based care (TBC) such include medical professionals with specialised training, such as doctors, clinical pharmacists, nurses, or other healthcare providers. The clinical pharmacist is a crucial team member and a key contributor for improving hypertension management due to his or her accessibility and knowledge of pharmacological therapy. In comparison to normal care, several meta-analyses of randomized studies have demonstrated significant reductions in blood pressure when pharmacists were involved.

Clinical pharmacists can contribute to HTN management in number of ways including with daily BP monitoring, provide information, identify and address non-adherence, and adjust antihypertensive dosages to help manage HTN and other health issues to achieve BP control.⁷

Identification of Hypertension

The patient is thought to be at risk for hypertension if their blood pressure level is between 140/90 mmHg and 180/110 mmHg. Ambulatory blood pressure monitoring (ABPM) is suggested by the NICE guideline as a method of diagnosis confirmation. Refer patients to the GP to look into probable severe hypertension if their blood pressure is 180/110 mmHg or higher. The NICE clinical definitions for the various "stages" (degrees of severity) of hypertension are provided in Table 1.

The diagnosis and therapy beginning approach for patients with hypertension is summarized by the Table 2. (excluding diabetes or pregnancy).⁸

Blood Pressure Measurement

The patient should be seated for five minutes with their arm supported at heart level while utilising an automatic blood pressure monitor.

According to the manufacturer's instructions, devices for monitoring blood pressure must be properly validated, maintained, and routinely.

If the patient has an irregular pulse, automated equipment might not generate an accurate measurement. Before taking your blood pressure, NICE advises palpating your radial or brachial pulse to check for any irregularities. If there are any irregularities, take your blood

pressure manually by directly auscultating over your brachial artery. Any irregularity in the patient's pulse should be reported to the GP for additional examination because it could be an indication of another illness, such as atrial fibrillation.⁹

Additional Investigation

Additionally, tests should be run to see if there is any indication that the target organ has been damaged, such as in the case of chronic renal disease or left ventricular hypertrophy.

- test for proteinuria by sending a urine sample for estimation of albumin: creatinine ratio and test for haematuria
- Assess glycated haemoglobin (HbA_{1c}), electrolytes, creatinine, estimated glomerular filtration rate (eGFR), serum total cholesterol, and high-density lipoprotein cholesterol
- Examine fundi for presence of hypertensive retinopathy
- Obtain an electrocardiogram (ECG).¹⁰

Hypertension and Diabetes

Patients with diabetes frequently have hypertension, many diabetic problems, such as diabetic eye disease and kidney disease, can be caused by high blood pressure (hypertension), or they might worsen the existing difficulties. Most people who have diabetes eventually develop high blood pressure, along with additional heart and circulation issues. Diabetes causes artery damage and makes them susceptible to atherosclerosis, a hardening of the arteries. This may result in high blood pressure, which, if left untreated, may damage blood vessels and cause heart attacks, kidney failure, and other problems.¹¹

Treatment Objectives

Blood pressure goals should be established within the practice in accordance with the American College of Cardiology (ACC) and American Heart Association (AHA). Fig 3 displays the systematic treatment protocol as determined by the ACC and AHA guideline.

Pharmacological Intervention

American Heart Association (AHA) clinical guidelines are recommendations on how healthcare and other professionals should care for people with specific conditions. According to AHA recommendations, the GP will typically start antihypertensive medication based on the stage/severity of hypertension as well as any other co-morbidities or hazards. Following the start of antihypertensive therapy, the patient is invited back for a follow-up consultation with the clinical pharmacist for a medication review and blood pressure check. The pharmacist should evaluate patient response to treatment and any problems with adherence. Before beginning treatment with an angiotensin-converting enzyme (ACE) inhibitor or an angiotensin-II receptor blocker (ARB), a patient should also have their renal function and serum electrolytes evaluated, as well as one to two weeks after starting the medication or receiving a dose increase.¹²

Medication Adjustments

The clinical pharmacist can search for undesirable effects and side effects and think of solutions. For instance, a clinical pharmacist who is also professional advisor and a drug therapy expert could move the drug to a different class or to another medication in the same class. Choosing which medication to prescribe can be aided by using the AHA algorithm for the treatment of hypertension.¹³

Drug Interactions

When assessing prescription drugs, clinical pharmacists can also look for any possible drug interactions. For example, certain antihypertensives (e.g. amlodipine, diltiazem) interact with simvastatin 40 mg, which can increase the risk of myopathy.

The clinical pharmacist can detect the risk, then support switching to a statin with a reduced risk of interaction with amlodipine (e.g. atorvastatin 20 mg) unless there are any contraindications.¹⁴

Periodic Evaluation of Hypertension

The patient's hypertension review can be scheduled by the clinical pharmacist for one month from the time that their blood pressure has been optimised, or earlier if clinically necessary.

Follow-up should typically be performed monthly by a clinical pharmacist for patients with hypertension who have a stable blood pressure within their goal range. The 20-minute review consultation should include:

- Measurement of BP
 - Weight
 - Waist circumference
- Assessment of general health
- Reinforcement of non-pharmacological advice
- Discussion about the patient's lifestyle, symptoms, and (if applicable) medication, including adverse effects
- Renal function tests (serum creatinine, electrolytes, eGFR, and a urine dipstick to check for proteinuria):
 - If proteinuria is present, consider checking a patient's urine albumin: creatinine ratio (ACR), which can also be managed by clinical pharmacists.

For the primary prevention of CVD, the score should be calculated for patients who are not taking any statins. A consultation with the clinical pharmacist should be scheduled to discuss initiating statin treatment if the score is greater than 10%.¹⁵

Role of Clinical Pharmacist

The following implementation strategies are designed to help clinical pharmacists in general practice in achieving the best possible hypertension management. The various duties performed by clinical pharmacists in the treatment of hypertension are shown in Fig 4.

- Confirm a diagnosis of hypertension
- Assess target organ damage in patients with primary hypertension
- Identify secondary causes of hypertension
- Understand the consequences of untreated hypertension

- Consider patient characteristics when choosing pharmacological treatment
- Reduce and maintain BP below the appropriate target
- Recommendations on lifestyle interventions
- Educate patient on disease, drug and provide updated guidance on hypertension¹⁶

If a patient's blood pressure is found to be consistently higher than the set treatment goals, the clinical pharmacist can see the patient to best manage their blood pressure. A clinical pharmacist can also consider any abnormal findings and, if necessary, refer a patient to a doctor.

In order to provide effective clinical care for patients with hypertension, clinical pharmacists can collaborate successfully with other members of the multidisciplinary general practise team. Through cost-effective prescribing and achieving quality of life, this has the potential to increase patient health outcomes, give practices value for money, and also dramatically lessen the workload for general practitioners.¹⁷

For patients who may have experienced an acute coronary syndrome, clinical pharmacists may additionally carefully add (up to the maximum tolerated doses) and monitor oral antihypertensive drugs initiated in secondary care, such as beta-blockers or ACE inhibitors (ACS).¹⁸

In addition to desire to decrease or stop taking antihypertensive medications, patients may become motivated to improve their lifestyles. A trial reduction or withdrawal of therapy should be offered to a patient whose blood pressure has been adequately controlled for a number of years and who has a low cardiovascular risk. They should also receive the proper guidance and be monitored for six months at 4-weekly intervals and then twice a year to make sure any recurrence is discovered.¹⁹

Since clinical management of patients with hypertension focuses primarily on medication management and reducing unnecessary polypharmacy, as well as patient counselling regarding diet and lifestyle, clinical pharmacists already possess the necessary skills to manage patients with hypertension, among patients who visits hospitals.²⁰

METHODS

The above study was done through web databases, and it included a detailed textual assessment of the roles and importance of clinical pharmacists in improving medication adherence and quality of life in chronic diseases such as diabetes, hypertension, hyperlipidemia, asthma and depression. The majority of the significant review and research publications were retrieved from websites such as Google, Google scholar, MEDLINE, Wiley library, MEDSPACE, and others. For our search, we used terms like adherence, clinical pharmacist, quality of life, and chronic disease. Only articles that focused on clinical pharmacist interventions in adherence and enhancing clinical outcomes were included.

RESULTS

There were a total of 112 articles found that were related to the subject of interest. 26 were thoroughly examined, with ten being excluded following a thorough examination since they did not meet the inclusion criteria. Various clinical pharmacist treatments have been demonstrated in literature studies in order to improve drug therapy and obtain better clinical outcomes, safety, effectiveness, and economy.

CONCLUSION

Clinical pharmacist-provided interventions may be beneficial as it allows hypertensive patients to stick their treatment plan, which will result in significantly lower levels of BP, LDL, BMI and complications from the heart disease. Hence this study concludes that a clinical pharmacist is crucial to the management of hypertensive patients in order to preserve their quality of life. This study may help to demonstrate the vital role of clinical pharmacists play in the treatment of hypertension. Therefore, this study may be useful in understanding the development of the pharmacist's interventional role in the treatment of hypertensive patients, and the future perspective of this study is for the implementation.

DISCUSSION

Hypertension is considered as serious health issue in India and other developing countries. The impact of clinical pharmacist involvement in a chronic illness care programme, especially one for hypertension, is thoroughly demonstrated in developed countries. Clinical pharmacist can reduce pressure on the healthcare system and helps in The management of

chronic diseases by providing Information about medications and lifestyle modifications to patients, and by acting as a referral point between the patient and doctor.

ACKNOWLEDGEMENT

We are grateful to Professor Dr. Jyoti G. Jain, Department of Pharmacology, Luqman College of pharmacy for valuable help with the manuscript.

CONFLICT OF INTEREST

No potential conflicts were reported regarding the manuscript.

ABBREVIATIONS

HTN: Hypertension; DM: Diabetes Mellitus; HRQOL: Health Related Quality of Life; LDL: Low Density Lipoproteins; HDL: High Density Lipoprotein; CKD: Chronic Kidney Diseases; CHF: Congestive Heart Failure; CVD: Cardiovascular Diseases; BP: Blood Pressure

TABLES

Table 1: Showing Interpretations of patients blood pressure

	Systolic (mm Hg)	Diastolic (mm Hg)
Typical	Below 120	Below 80
Elevated (hypertension)	120-129	Below 80
Stage1 hypertension	130-139	80-90
Stage 2 hypertension	140 or Above	90 or Above
Hypertensive Crisis	Over 180	Over 120

Table 2: Guidelines for hypertension treatment

ACC/AHA Guidelines for Hypertension Management
● Anything above 140/90 mm Hg needs to be treated
● Anything above 130/80 mm Hg needs to be treated if patient had CV event or is at risk of CV event (based on age, presence of DM, CKD or calculation of atherosclerotic risk)
● Goal of treatment should be to maintain BP under 130/80 mm Hg

Specific lifestyle recommendations

- Advice to loose weight
- Follow a DASH pattern diet
- Reduce sodium intake (less than 1500 mg/day)
- Increase potassium intake (3500 mg/day through dietary intake)
- Increase physical activity
- Limit alcohol intake

FIGURES

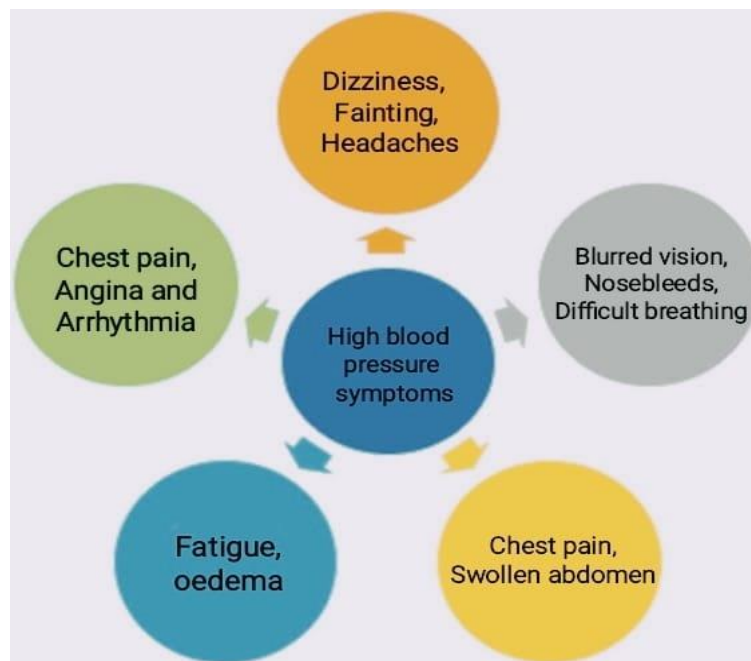


Fig 1: High blood pressure symptoms

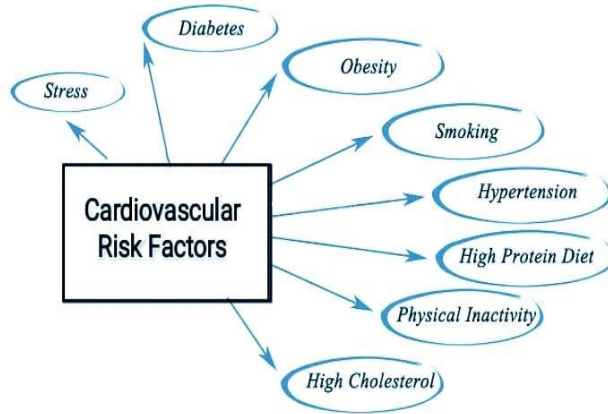


Fig 2: Risk factors of hypertension



Fig 3: Comprehensive hypertension treatment protocol



Fig 4: Clinical pharmacists different roles in relation to HTN therapy

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