

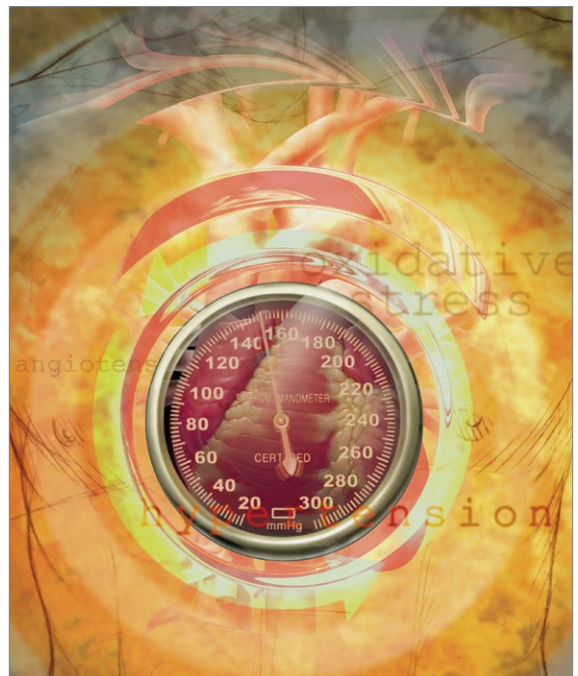
How to diagnose and manage hypertension in a psychiatric patient

Increased risk of morbidity and mortality; be vigilant in drug–disease, drug–drug interactions

Hypertension is a widespread, under-recognized, and undertreated cause of morbidity and mortality in the United States and is associated with several psychiatric illnesses. Left untreated, hypertension can have significant consequences, including increased risk of stroke, coronary heart disease, heart failure, chronic kidney failure, and death. Approximately 70 million adults in the United States have hypertension, but only 60% of them have been diagnosed, and of those only 50% have their blood pressure under control.¹ In 2013, 360,000 deaths in the United States were attributed to hypertension.²

Hypertension is associated with major depressive disorder, generalized anxiety disorder, bipolar disorder, and schizophrenia.³⁻⁵ Additionally, impulsive eating disorders, substance abuse, anxiety, and depression are associated with a hypertension diagnosis, although patients with panic disorder develop hypertension at a younger age.⁶ A 2007 study found a 61% prevalence of hypertension in those with bipolar disorder compared with 41% among the general population.⁷ The strong link between bipolar disorder and hypertension might be because of a common disease mechanism; both are associated with hyperactive cellular calcium signaling and increased platelet intracellular calcium ion concentrations.⁸

Hypertension not only is common among patients with psychiatric illness, it likely contributes to worse clinical outcomes. Studies across different cultures have found higher mortality rates in individuals with mental illness.⁹⁻¹¹ Persons



MEDICAL IMAGES RM/SCOTT BODELL

Robert M. McCarron, DO

Associate Professor
 Director, Pain Psychiatry and Behavioral Sciences
 Director, Internal Medicine/ Psychiatry Residency
 Department of Anesthesiology, Division of Pain Medicine
 Department of Psychiatry and Behavioral Sciences
 Department of Internal Medicine
 University of California, Davis,
 School of Medicine
 Sacramento, California
 Member, CURRENT PSYCHIATRY Editorial Board

Craig R. Keenan, MD

Professor
 Program Director, Internal Medicine Residency Program
 Department of Internal Medicine
 University of California, Davis,
 School of Medicine
 Sacramento, California

Banoo Lashai, MD

Resident Physician
 Department of Psychiatry
 Richmond University
 Medical Center
 New York, New York

John C. Onate, MD

Associate Professor
 Department of Psychiatry
 of Behavioral Sciences
 Medical Director
 Sacramento County Primary Care Clinic
 Sacramento, California

Disclosures

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A study found a 61% prevalence of hypertension among those with bipolar disorder compared with 41% in the general population



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Table 1

Medications that can elevate blood pressure

Nonsteroidal anti-inflammatory agents
Corticosteroids
Anabolic steroids
Serotonin reuptake inhibitors
Serotonin-norepinephrine reuptake inhibitors
Tricyclic antidepressants
Monoamine oxidase inhibitors
Cyclosporine
Tacrolimus
Erythropoietin
Methylphenidate
Amphetamines
Decongestants
Oral contraceptives

with schizophrenia and other severe mental illnesses may lose ≥ 25 years of life expectancy, with the primary cause of death being cardiovascular disease, not suicide.¹² Patients with depression have a 50% greater risk of cardiovascular disease, which is equivalent to the risk of smoking.¹³

Schizophrenia is strongly associated with numerous comorbidities and has been linked significantly to an elevated 10-year cardiac risk after controlling for body mass index.⁵ The high rate of non-treatment of hypertension for patients with schizophrenia (62.4%) is especially concerning.¹⁴

Because of the well-documented morbidity and mortality of hypertension and its increased prevalence and undertreatment in the psychiatric population, mental health providers are in an important position to recognize hypertension and evaluate its inherent risks to direct their patients toward proper treatment. This article reviews:

- the signs and symptoms of hypertension
- the mental health provider's role in the evaluation and diagnosis
- how psychotropic drugs influence blood pressure and drug-drug interactions
- the management of hypertension in psychiatric patients, including strategies for counseling and lifestyle management.

Diagnosing hypertension

Hypertension is defined as a blood pressure $>140/90$ mm Hg, the average of ≥ 2 properly measured readings at ≥ 2 visits in a medical setting.¹⁵ The proper equipment, including a well-fitting blood pressure cuff, and technique to measure blood pressure are essential to avoid misdiagnosis. The patient should be at rest for ≥ 5 minutes, without active pain or emotional distress.

Most cases of hypertension (90% to 95%) are primary, commonly called essential hypertension. However, the differential diagnosis also should consider secondary causes, which may include:

- obesity
- medications
- chronic alcohol use
- methamphetamine or cocaine use
- primary kidney disease
- atherosclerotic renal artery stenosis
- obstructive sleep apnea
- hypothyroidism
- primary hyperaldosteronism
- narrowing of the aorta
- Cushing syndrome
- primary hyperparathyroidism
- polycythemia
- pheochromocytoma.

Common medications, including several psychiatric drugs, also can contribute to elevated blood pressure (*Table 1*).

Medical evaluation. Once the diagnosis of hypertension is made, a medical evaluation is indicated to determine if the patient has end-organ damage from the elevated pressures, such as renal disease or heart disease, to identify other modifiable cardiovascular risk factors, such as hyperlipidemia, and to screen for secondary causes of hypertension. This evaluation includes¹⁵:

- a physical exam
- review of medications
- lipid profile
- urinalysis to screen for proteinuria
- serum electrolytes and creatinine
- electrocardiogram to screen for left ventricular hypertrophy or prior infarction
- fasting glucose or hemoglobin A_{1c} to screen for type 2 diabetes mellitus.

Table 2

Drug–drug interactions between psychotropic medications and antihypertensive agents

Antihypertensive medication class	Psychotropic medications	Caution
Diuretics	Lithium	Watch for dehydration and increased serum lithium level
Several taken at the same time	Venlafaxine	Watch for increased blood pressure
Several taken at the same time	Psychotropics with high α -1 blockade	Watch for potential hypotension
Any class	Monoamine oxidase inhibitors	Hypotension (α -1 blockade) Hypertension (food with tyramine may cause catecholamine surge and hypertensive crisis)
Any class	Stimulants	Watch for increased blood pressure

Psychotropic drugs. In psychiatric patients, the evaluation must consider the potential impact psychotropic drug effects and drug–drug interactions can have on blood pressure (Table 2). For example, patients taking both diuretics and lithium are at increased risk for dehydration and increased serum lithium levels, which could cause severe neurologic symptoms and renal insufficiency.¹⁶ Several antihypertensives when taken with venlafaxine can increase blood pressure, but antihypertensives with α -1 blocking psychotropics can decrease blood pressure. Monoamine oxidase inhibitors can cause hypotension or hypertension with various classes of antihypertensives. Stimulants, such as methylphenidate, atomoxetine, dextroamphetamine, armodafinil, or modafinil, alone or combined with antihypertensives, can cause hypertension.¹⁷

Substance abuse, particularly alcohol, methamphetamine, and cocaine, can cause difficulty controlling blood pressure. Patients with refractory hypertension should have a reassessment of substance abuse as a potential cause.

Screening guidelines for mental health providers

For many patients with severe mental illness, visits to their mental health providers might be their only contact with the medical system. Therefore, screening in the mental health settings could detect cases that otherwise would be missed.

Screening recommendations. The U.S. Preventive Services Task Force recommends screening for hypertension in the general population beginning at age 18.¹⁸ Adults age 18 to 39 with normal blood pressure (<130/85 mm Hg) and no other risk factors (eg, overweight, obese, or African American) can be screened every 3 years. Those with risk factors or a blood pressure of 130/85 to 139/89 mm Hg and adults age \geq 40 should have annual screenings.

Ideally, psychiatrists and other mental health providers should monitor blood pressure at each visit, especially in patients taking psychotropics because of their higher risk for hypertension.

Optimizing treatment. Once the diagnosis of essential hypertension is established, identifying psychiatric comorbidities and the severity of psychiatric symptoms are important to optimize treatment adherence. Patients with increased depressive symptoms are less likely to comply with antihypertensive medication,¹⁹ and patients with confirmed depression are 3 times more likely to not adhere to medical treatment recommendations than non-depressed patients.²⁰

Physicians' attitudes toward hypertension also can affect patients' compliance and blood pressure control.²¹ Psychiatrists should be empathetic and motivational toward patients attempting to control their blood pressure. The Seventh Joint National Committee on the Prevention, Detection,

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Several antihypertensives when taken with venlafaxine can increase blood pressure



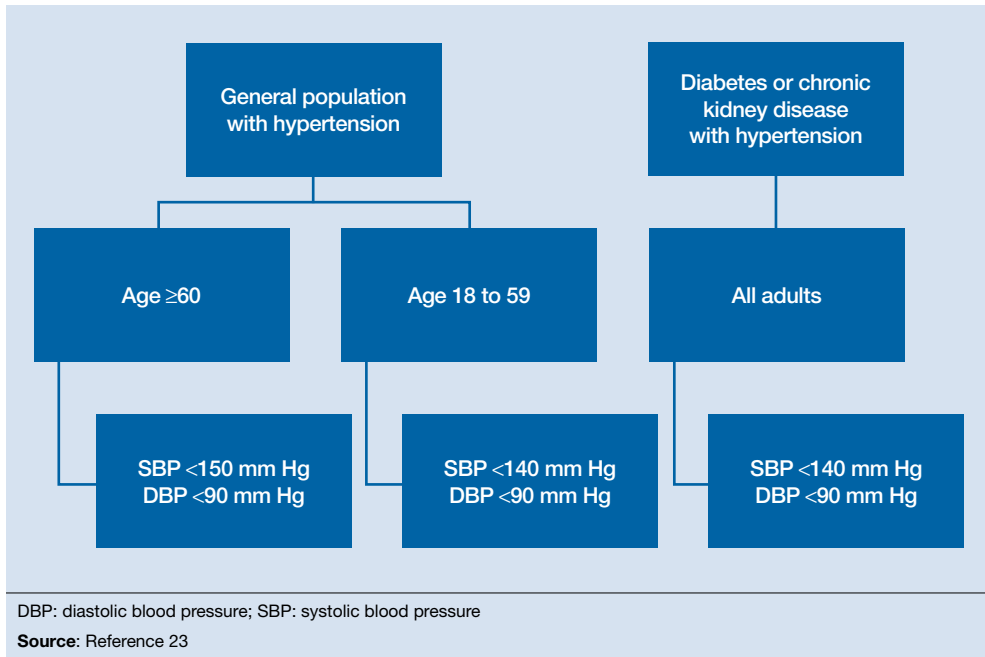
Hypertension

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Patients with increased depressive symptoms are less likely to comply with antihypertensive medication

Figure

Blood pressure goals in adults



Evaluation, and Treatment of High Blood Pressure states, “Motivation improves when patients have positive experiences with, and trust in, the clinician. Empathy builds trust and is a potent motivator.”²²

Treatment and management

Treatment of hypertension significantly reduces the risk of stroke, myocardial infarction, renal injury, heart failure, and premature death. Studies show that treatment that reduces systolic blood pressure by 12 mm Hg over 10 years will prevent 1 death for every 11 patients with essential hypertension. In those with concomitant cardiovascular disease or target organ damage, such a reduction would prevent death in 1 of every 9 patients treated.¹⁵

Blood pressure goals. The 2014 Eighth Joint National Committee Guideline for Management of High Blood Pressure in Adults provides guidance on blood pressure goals depending on patients’ underlying medical history (Figure).²³ Based on expert opinion and randomized controlled

studies, blood pressure goals for patients *without* diabetes or chronic kidney disease (CKD)—an estimated or measured glomerular filtration rate (GFR) of ≤ 60 mL/min/1.73 m²—depend on age: $<140/90$ mm Hg for age 18 to 59 and $<150/90$ mm Hg for age ≥ 60 . For patients *with* diabetes or CKD, the blood pressure goal is $<140/90$ mm Hg, regardless of age.

However, not all experts agree on these specific blood pressure goals. A major trial (SPRINT) published in 2015 found that intensive blood pressure goals do benefit higher-risk, non-diabetic patients.²⁴ Specifically, the study randomized patients age ≥ 50 with systolic blood pressure of 130 to 180 mm Hg and increased cardiovascular risk to systolic blood pressure targets of <140 mm Hg (standard) or <120 mm Hg (intensive). Characteristics of increased cardiovascular risk were clinical or subclinical cardiovascular disease other than stroke, CKD with GFR of 20 to 60 mL/min/1.73 m², age ≥ 75 , or Framingham 10-year coronary heart disease risk score $\geq 15\%$. Intensive treatment significantly reduced overall mortality and the rate of acute coronary syndrome, myocardial infarction, heart



Hypertension

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For patients with diabetes or CKD, the blood pressure goal is <140/90 mm Hg; for non-diabetic patients age ≥ 50 , consider a goal of <120 mm Hg

failure, stroke, or cardiovascular death. However, the results of this study have not been assimilated into any recent guidelines. Therefore, consider a goal of <120 mm Hg for non-diabetic patients age ≥ 50 with any of these factors.

Lifestyle modifications. Psychiatrists are well equipped to motivate and encourage behavioral modification in patients with hypertension. Counseling and structured training courses could help to effectively lower blood pressure.²⁵ Patients should receive education on lifestyle modifications including:

- weight reduction
- physical activity
- moderate alcohol consumption
- decreased sodium consumption
- implementation of the Dietary Approaches to Stop Hypertension (DASH) or Mediterranean diets.¹⁵

Maintaining a normal body weight is ideal, but weight reduction of 10 lb can reduce blood pressure in overweight patients. The DASH diet, consisting of fruits, vegetables, low-fat dairy products, high calcium and potassium intake, and reduced saturated and total fat intake can decrease systolic blood pressure from 8 to 14 mm Hg. Reduction of sodium intake to $\leq 2,400$ mg/d can reduce systolic blood pressure from 2 to 8 mm Hg. Regular aerobic exercise of 30 minutes a day most days of the week can reduce systolic blood pressure up to 9 mm Hg. Patients also should be encouraged to quit smoking. Patients who implement ≥ 2 these modifications get better results.

Antihypertensive medications. Patients who do not reach their goals with lifestyle measures alone should receive antihypertensive medications. Most patients will require ≥ 2 agents to control their blood pressure. Clinical trials show that some patient subgroups have better outcomes with different first-line agents.

For example, in non-African American patients, thiazide diuretics, calcium channel blockers, angiotensin receptor blockers, and angiotensin-converting enzyme inhib-

itors are first-line treatments (*Table 3*). For African American patients without CKD, first-line treatments should be thiazide diuretics and calcium channel blockers, because angiotensin-converting enzyme inhibitors and angiotensin receptor blockers do not reduce cardiovascular events as effectively. African American patients with CKD and proteinuria, however, benefit from angiotensin-converting enzyme inhibitors or angiotensin receptor blockers and are preferred first-line agents. However, blood pressure control is a more important factor in improving outcomes than the choice of medication.

Psychiatrists' role. Psychiatrists should aim to collaborate with the primary care provider when treating hypertension. However, when integrative care is not possible, they should start a first-line medication with follow-up in 1 month or sooner for patients with severe hypertension ($>160/100$ mm Hg) or significant comorbidities (eg, CKD, congestive heart failure, coronary disease). Patients with blood pressure $>160/100$ mm Hg often are started on a thiazide diuretic with one other medication because a single agent usually does not achieve goal blood pressure. Patients with CKD need close monitoring of potassium and creatinine when starting angiotensin-converting enzyme inhibitor or angiotensin receptor blocker therapy, usually within 1 to 2 days of starting or adjusting their medication. Adjust or add medication dosages monthly until blood pressure goals are reached.

A general internist, cardiologist, or nephrologist who has expertise in managing complex cases should oversee care of a psychiatric patient in any of the following scenarios:

- suspected secondary cause of hypertension
- adverse reaction to antihypertensive medications
- complicated comorbid conditions (ie, creatinine >1.8 mg/dL, worsening renal failure, hyperkalemia, heart failure, coronary disease)
- blood pressure $>180/120$ mm Hg
- requires ≥ 3 antihypertensive medications.

Table 3

Choice of initial drug therapy for hypertension

Patient group	First-line agents
African American patients without CKD	Thiazide diuretic Calcium channel blocker
Non-African American patients without CKD	Thiazide diuretic Calcium channel blocker Angiotensin-converting enzyme inhibitor or angiotensin receptor blocker
African American patients with CKD	With proteinuria Angiotensin-converting enzyme inhibitor or angiotensin receptor blocker Without proteinuria Thiazide diuretic Calcium channel blocker Angiotensin-converting enzyme inhibitor or angiotensin receptor blocker
Non-African American patients with CKD	Angiotensin-converting enzyme inhibitor or angiotensin receptor blocker
Patients with type 2 diabetes mellitus	Treatment based on ethnicity and CKD, as above

CKD: chronic kidney disease
Source: Reference 23

Summing up

Hypertension is a significant comorbidity in many psychiatric patients, but usually is asymptomatic. Often the psychiatrist or other mental health provider will diagnose hypertension because of their frequent contact with these patients. Once the diagnosis is made, an initial evaluation can direct lifestyle modifications. Patients who continue to have significant elevation of blood pressure should start pharmacotherapy, either by the psychiatrist or by ensuring follow-up with a primary care physician. The psychiatrist may be able to manage cases of essential hypertension, but always must be vigilant for potential drug-disease or drug-drug interactions during treatment. A team-based approach may improve health outcomes in psychiatric patients.

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continued

Clinical Point

Motivate and educate patients on lifestyle modifications, such as weight reduction, exercise, and alcohol and sodium intake



Hypertension

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When possible, collaborate with the primary care physician; adjust or add medication dosages monthly until the goal is reached

Related Resources

- National High Blood Pressure Education Program. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Bethesda, MD: U.S. Department of Health and Human Services; 2004.
- Framingham heart study. www.framinghamheartstudy.org/risk-functions/cardiovascular-disease/10-year-risk.php.

Drug Brand Names

Armodafinil • Nuvigil	Methylphenidate • Concerta,
Atomoxetine • Strattera	Ritalin
Cyclosporine • Sandimmune	Modafinil • Provigil
Dextroamphetamine •	Tacrolimus • Protopic,
Dexedrine, ProCentra	Hecoria, Prograf
Lithium • Eskalith, Lithobid	Venlafaxine • Effexor

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Bottom Line

Recognize and manage hypertension in psychiatric patients with the proper technique for taking blood pressure and conducting an evaluation that accounts for the effects of psychotropic drugs. Lifestyle modifications can control blood pressure in many patients, but antihypertensive therapy is indicated in refractory cases.