African Americans: Ethnopharmacology

by Grace Ferguson (written for The SAGE Encyclopedia)

By incorporating ethnopharmacology into their everyday practices, health care professionals can improve their quality of care to African Americans. Also referred to as cross-cultural pharmacology, ethnic pharmacology, interethnic pharmacology and transcultural pharmacology, ethnopharmacology involves the study of how varying ethnicities respond to different drugs. Ethnopharmacology is particularly important to the African American population, which has shown opposing reactions to several medications than other ethnic groups. Note that for research purposes African Americans are generally referred to as blacks.

In general, ethnopharmacology studies have concentrated on two main groups: psychotropic and cardiovascular medications, the former addressing mental health and the latter focusing on heart complications. For example, studies have shown that African American patients may need smaller doses of the psychotropic medication, lithium—which is used to treat bipolar disorder—than white patients. Further, African Americans may need higher doses of beta blockers—which are used to treat hypertension—than whites. Research on the difference in African American response to medications for other illnesses, such as diabetes and asthma, compared to other ethnicities has also been conducted.

Studies show that a greater share of African Americans and Latinos are less than half as likely as whites to have a regular physician and are without a regular health care facility. In addition, more than 103 million people of color suffer excessively in the health care system. Therefore, a health care system that includes ethnopharmacological principles in its treatment approach will enable suitable care for African Americans.
**Mental Health/Psychotropic Drug Response**

African Americans are more likely than other populations to suffer from sleep paralysis, phobias, and somatic symptom disorder. In addition, they represent a high portion of military persons returning home with post-traumatic stress disorder. In general, African Americans have lower rates of alcohol use in adulthood and a later initiation date during adolescence than European Americans. However, African Americans seem to have more injuries and illnesses relating to alcohol use and are sometimes more likely to have dependence issues. In short, although they drink less, they experience more problems.

For the majority of African Americans, alcohol and drug abuse generally becomes an issue later in life. Research has not pinpointed specific reasons for this, but some theories exist. For example, researchers suggest that African American family principles, including religious commitment and kinship bonds, have a powerful hold over African American youths; however, when transitioning to adulthood, many of these adolescents lose such protections and begin to indulge in drugs and alcohol as a way of dealing with societal issues, such as racism; this substance use can develop into addiction, which is a form of mental illness.

Psychotropic drugs are used to treat symptoms of mental disorders, such as bipolar disorder, schizophrenia, depression, attention deficit hyperactivity disorder, and anxiety disorders. Research has found that African Americans respond differently to certain psychotropic drugs than other ethnic groups. In a study examining the effectiveness and safety of selective serotonin reuptake inhibitors—which are generally used as antidepressants—African American women consuming 20mg of fluoxetine had major adverse reactions and a lower therapeutic dose was found compared to whites. The study also revealed that African Americans respond quicker (and at lower doses) to tricyclic antidepressants, while experiencing neurotoxicity at greater
levels. Neurotoxicity occurs when toxic chemicals destroy the brain and other parts of the nervous system.

Cytochrome P450 enzymes are vital to the digestion of many medications; this group has over 50 enzymes, with 6 of them metabolizing 90 percent of medications, the two most important enzymes being CYP2D6 and CYP3A4. The majority of antipsychotic drugs, which are used to treat psychosis, are partially metabolized via the CYP2D6 enzyme. Research concerning CYP450 enzyme activity indicates that African American and Asian patients should receive lower doses of many antipsychotic medications. Despite this finding, however, compared to whites, African Americans regularly receive higher doses, experience greater levels of unintentional psychiatric hospitalizations, are more likely to receive intramuscular injection, and have substantially greater rates of seclusion-and-restraint application while in psychiatric facilities. Further, African American adolescents with bipolar depression were almost twice as likely to receive antipsychotic medications.

**Cardiovascular Drug Response**

Heart disease is the leading cause of death for all Americans. Diabetes, high blood pressure (also known as hypertension), and obesity are common ailments that heighten the risk of heart disease. High blood pressure develops earlier in life—and is more severe—for blacks than whites. African Americans are almost twice as likely to develop diabetes as non-Hispanic whites. Further, 63 percent of non-Hispanic men age 20 and older and 77 percent of women in that racial and age range are obese or overweight.

Beta blockers, diuretics, angiotensin-converting enzyme (ACE) inhibitors, and angiotensin II receptor blockers (ARBs) are medications used to treat high blood pressure. Research has shown that certain ACE inhibitors, such as enalapril and captopril, and the ARB,
losartan, were less useful in African Americans than in whites. However, African Americans seem to respond more favorably than whites to thiazide diuretics. Beta blockers can have different results among ethnic groups, but African Americans may need higher doses than whites.

Along with diuretics, calcium channel blockers are among the most useful types of drugs to lower blood pressure in patients of African ancestry. Research shows that with high salt consumption, the blood pressure lowering impact of calcium channel blockers surpassed the effect of ACE inhibitors in patients of African ancestry, but not in patients of European ancestry. Since African Americans have higher rates of salt sensitivity, diuretics—which are particularly effective in treating salt-sensitive patients—work especially well for this population. Notably, because African Americans tend to have such chronic hypertension, multiple drugs are often needed to control their blood pressure.

The combination drug isosorbide dinitrate/hydralazine hydrochloride (brand name BiDil), is said to be useful in treating congestive heart failure in blacks. This is a debatable issue because although BiDil operates as a treatment for congestive heart failure for all racial groups, the research leading to the drug’s Food and Drug Administration (FDA) approval was conducted only on African Americans. No whites, Hispanics or Asians were tested.

Metformin is a medication used to treat patients with type 2 diabetes. It helps control blood sugar levels, improves glucose tolerance, and helps the body respond more favorably to insulin. It is the most commonly prescribed oral medication for diabetes and is sometimes used with insulin and other drugs. A US study reveals that African Americans taking metformin had greater improvements in their blood sugar control than whites who were also taking the same medication. Specifically, the maximum dose of metformin was related to a reduction in
hemoglobin A1C values of 0.9 percent among African Americans as opposed to a 0.42 percent decrease in whites.

**Other Drug Responses**

African Americans are 20 percent more likely to develop asthma than non-Hispanic whites. Further, African American women have the greatest asthma mortality rate, over 2.5 times higher than white women. There is a shortage of scientific data concerning which medications can best treat and prevent asthma in African Americans. However, a study conducted in the US reveals that asthmatic and non-asthmatic African Americans needed higher doses of glucocorticoids to suppress lymphocytes (white blood cells), which contribute to airway inflammation. This conclusion led researchers to speculate that African Americans might have a lower asthma medication response rate, which can result in difficulty controlling the asthma.

The study was done on African Americans and Caucasians with asthma and similar levels of airflow restriction and asthma-control medication requirements and on African Americans and Caucasians without asthma. The African American asthma patients needed greater concentration of glucocorticoids to suppress the production of white blood cells. This difference in response between both (black and white) asthma groups was also discovered among those who did not have asthma. The researchers found that along with race being a factor in patients with asthma, glucocorticoid response may depend on age, the inhaled glucocorticoid dose, and T-lymphocyte (one of the two main types of lymphocytes) activity.

Realizing the need for more data on African American response to asthma medications, a number of researchers are investigating children, adolescents and adults of African origin with asthma.
The drug tacrolimus is used in combination with other pharmaceuticals to stop the body from rejecting a transplanted organ, such as liver, heart or kidney. A US study assessing kidney transplant patients shows that African Americans needed higher doses of tacrolimus to arrive at trough levels—the amount of a medication at its lowest level in the body—similar to those seen in white patients.

The anticoagulant, warfarin, is used to prevent blood clots from developing or becoming larger in the blood and blood vessels. It is generally prescribed to people with thrombosis or those who have had a heart attack, certain forms of irregular heartbeat, or mechanical or replacement heart valves. Race has been stated to contribute to differences in warfarin dosing criteria, with African American needing higher doses of warfarin than whites and Asians requiring lower dosage than whites. However, a genome-wide association study discovered that African Americans with a single copy of the rs12777823 gene variant would need to lower their dosage of warfarin by 6.92mg per week to get all the advantages of the medication. African Americans with two copies of this genetic variation would need to lower their dosage by approximately 9mg per week.

Metabolism is the chemical reactions that happen in a cell, which allow it to keep existing, maturing and dividing. The human body is made up of a large number of metabolic pathways; depending on the medication, certain ethnic groups may be more affected by genetic variations within the pathway. For example, medications metabolized through the debrisoquine-sparteine pathway may include beta blockers, antidepressants, opioids, antiarrhythmics and antipsychotics. Research indicates that African Americans, Native Americans, and Asian Americans are more impacted by genetic variations within this pathway. Another example: the acetylation pathway is a critical component in determining the rate of metabolism, with the term
“extensive metabolizers” meaning normal reaction and the term “slow metabolizers” meaning prone to toxic reactions. Research indicates that the slow rate for Egyptians and Moroccans is 80 percent to 90 percent, the slow rate for Caucasian and African Americans is 50 percent, and the slow rate for Asian-Americans is 5 percent to 15 percent.

**Inclusion of Ethnopharmacology in Health Care Approach**

For other racial/ethnic minorities, such as Latinos/Hispanics and American Indians/Alaska Natives, language is a major barrier and plays a significant role in their interaction with health care professionals and their utilization of the health care system. For African Americans, however, these issues are less of a problem since English is the main language of African Americans. For this population, health care access is primarily connected to disparities in illness and disease management, accessibility of health care resources, and racial discrimination within health care encounters. For example, studies on the topic of surgical and medical management of heart disease have shown that African Americans with nearly the same medical needs as whites are approximately half as likely to obtain interventional and diagnostic treatments for heart disease. Further, African Americans frequently end up obtaining medical assistance from facilities with fewer resources, and if they happen to receive treatment in a better facility, they often receive lower quality care.

When assessing an African American patient’s symptoms, the health care professional should take into account the patient’s beliefs and knowledge of their condition plus their treatment expectations. The professional should also evaluate the patient’s patterns in seeking medical assistance, which will enable targeted interventions. Patients should have an understanding of their support system, such as family and friends, so they can take advantage of those resources while working through their problems. Ultimately, an ethnopharmacological
approach should consider the patient’s personal and cultural background plus any genetic variation that could affect the absorption of medications.

During the assessment period, the health care professional should perform a diagnostic appraisal regardless of prior diagnosis. This diagnosis should be based on cultural design, including the patient’s help-seeking history and any use of alternative treatment methods. When prescribing medication, the patient’s full medical history—including diet and medications currently being taken—and potential variations in drug metabolism should be considered. In addition, involving the patient and his or her family in medication decisions, selecting medications with the safest side-effect profiles, informing the patient about such side-effects, and educating the patient about his or her illness and treatment options can improve the quality of care toward African American patients. Continuing research concentrating on the inclusion of African Americans in clinical observations to best comprehend medication dosage, safety, efficiency, and tolerance level should be conducted.

Nurses are at the front-line of patient care and are especially equipped to collect and evaluate cultural data. They should be aware of which questions to include in their cultural evaluation and how to phrase those questions in order to receive accurate cultural profiles. Patients generally will not offer cultural information on their own; if the nurse does not include such questions in his or her assessment, the required data will likely not be obtained.

Nurses should apply sensitivity when conducting cultural assessments. For best results, questions should be framed in a way that connects the patient’s situation to family members or other patients. For example, a nurse might ask, “How does your father feel about taking medication?” Or, “I know another patient who believes that taking psychotropic drugs causes one to losing control. Do you agree with that?” Linking questions to someone else helps the
patient feel more comfortable expressing his or her personal views and beliefs. Cultural evaluations should also seek to understand the patient’s history and outlook on herbal remedies, as herbal medications sometimes interact unfavorably with prescribed pharmaceuticals, resulting in harmful effects.

**Further Readings**


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