Diabetes & Cardiovascular Disease Review

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AMERICAN COLLEGE of CARDIOLOGY

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Issue 2: Hypertension in Diabetes

Hypertension in Diabetes

The ABCs of Diabetes is a mnemonic device designed to remind providers and patients of the three clinical issues—**A**1C, **B**lood pressure, and **C**holesterol—that must be addressed to minimize the occurrence of macrovascular events (heart attack, stroke, and peripheral vascular disease).

In the ABCs of Diabetes, the letter "B" stands for "blood pressure." Hypertension is an extremely common comorbidity of diabetes, affecting 20–60% of individuals with diabetes. The prevalence of hypertension in the diabetic population is 1.5 to 3 times higher than that of nondiabetic age-matched groups (1). Diagnosis and treatment of hypertension is important in preventing cardiovascular disease in people with diabetes. Observational studies show that people with both diabetes and hypertension have approximately twice the risk of cardiovascular disease as nondiabetic people with hypertension. The greatest reduction in cardiovascular mortality occurs at achieving a diastolic blood pressure of ~80 mmHg (2–4). Epidemiological evidence indicates that there is a benefit to reducing systolic blood pressure to <130 mmHg (5). Therefore, aggressive blood pressure control should be attempted in all patients with diabetes.

What's Inside

In addition to its role in macrovascular complications, hypertension greatly increases the risk for renal insufficiency, diabetic retinopathy, and possibly neuropathy in diabetic individuals (6–8). In the United Kingdom Prospective Diabetes Study (UKPDS), each 10-mmHg decrease in mean systolic blood pressure was associated with a reduction in risk of 12% for any complication related to diabetes, 15% for deaths related to diabetes, 11% for myocardial infarction, and 13% for microvascular complications (9). No threshold of risk was observed for any end point. Based on these findings, goal-oriented treatment of hypertension is important in decreasing both the macrovascular and microvascular complications of diabetes.

The Third National Health and Nutrition Evaluation Survey (1988–1994) (NHANES III) demonstrates how far we have to go to adequately address hypertension in people with diabetes (10). The survey disclosed the following results:

- 71% of diabetic individuals were found to have hypertension.
- 29% of diabetic individuals with hypertension were unaware of the diagnosis.
- 43% of diabetic individuals with hypertension were untreated.
- 55% of diabetic individuals on treatment had a blood pressure ≥140/90.
- 12% of diabetic individuals on treatment had a blood pressure <130/85.

This article summarizes goals for the treatment of blood pressure as well as recommendations for detection and effective therapies. All recommendations are based on the American Diabetes Association technical review "Treatment of Hypertension in Adult Patients with Diabetes" (11) and are found in the accompanying position statement (12).

Initial Evaluation

The first step in addressing hypertension is to identify all individuals with diabetes who also have elevated blood pressure. All patients with diabetes should have blood pressure measured at the time of diagnosis or initial office evaluation and at each scheduled diabetes visit (13). The measurement of blood pressure should ideally be performed in the supine and standing position. Two or more determinations in each position should be obtained using an appropriately sized cuff. The diagnosis of hypertension in patients with diabetes should be reserved for those individuals whose blood pressure levels are found to be elevated on at least two separate occasions separated by at least 1 week. Because of the high cardiovascular risk associated with a blood pressure reading >130/80 mmHg in patients with diabetes, 130/80 mmHg is considered to be the treatment goal of hypertension. Indications for initial treatment and goals for adult hypertensive patients with diabetes are presented in Table 1.

Table 1.
Indications for Initial Treatment and Goals for Adult Hypertensive Patients With Diabetes

	Blood pressure	
	Systolic	Diastolic
Goal (mmHg)	<130	<80
Behavioral therapy alone (maximum 3 months), then add pharmacological treatment	130–139	80–89
Behavioral therapy and pharmacological treatment	≥140	≥90

Initial assessment of a hypertensive diabetic patient should include a complete medical history, with special emphasis on cardiovascular risk factors and the presence of diabetes complications and other cardiovascular complications. The physical examination should include height, weight, funduscopic examination, and careful evaluation of arterial circulation. The initial laboratory examination should include serum creatinine, electrolytes, an A1C test, a fasting lipid profile, and urinary albumin excretion (this can be measured by semi-quantitative methods as screening tests, by quantitative methods in timed urine samples, or as an albumin-to-creatinine ratio in spot samples).

Nonpharmacological Treatment of Hypertension

In patients with a systolic blood pressure of 130–139 mmHg or a diastolic blood pressure of 80–89 mmHg, a behavioral approach alone may be used for at least 3 months. Behavioral interventions include *1*) dietary sodium restriction, *2*) weight loss, *3*) increased physical activity, *4*) smoking cessation, and *5*) moderation of alcohol consumption.

Dietary sodium restriction has been shown in controlled trials of essential hypertension to result in a reduction of ~5 mmHg for systolic blood pressure and ~2–3 mmHg for diastolic blood pressure, with moderate sodium restriction (14). A dose-response effect on blood pressure has been observed with sodium restriction. Weight loss can reduce blood pressure independent of sodium intake. The loss of 1 kg body weight has resulted in decreases in mean arterial blood pressure of ~1 mmHg (15). Physical activity of moderate intensity, such as 30–45 min of brisk walking most days of the week, has been shown to lower blood pressure (16). Smoking cessation and moderation of alcohol intake are clearly appropriate for all patients with diabetes. If after a trial period of behavioral treatment blood pressure remains >130 mmHg systolic or >80 mmHg diastolic, pharmacological treatment should be added.

Drug Treatment of Hypertension

Patients with a confirmed blood pressure ≥140/90 mmHg are candidates for immediate pharmacological treatment in addition to behavioral treatment. At the doses available for clinical use, most antihypertensive agents will produce a reduction in systolic or diastolic blood pressure of 5–10% in patients with mild or moderate hypertension. Therefore, treatment of hypertension, with a goal of <130/80 mmHg, will require more than one drug in most patients and three or more in many. Further, when choosing antihypertensive agents, providers should consider the effect of the medication on the progression of microvascular and macrovascular complications. Drugs considered appropriate for initial pharmacological treatment include ACE inhibitors, angiotensin receptor blockers (ARBs), low-dose thiazide diuretics, and ß-blockers.

Whereas a complete discussion of each class of medication is beyond the scope of this article, the reader is referred to the recent American Diabetes Association technical review on hypertension (11). A summary of recommended antihypertensive agents and their effects on adult hypertensive diabetic patients are provided in Table 2. Please note that achieving the target blood pressure may be more important than the particular drug regimen used. Finally, treatment decisions should, of course, be individualized based on the clinical characteristics of the patient, including comorbidities, tolerability, personal preference, and cost, especially for patients who must pay out of pocket for medications.

ACE inhibitors. Because of the large number of studies in diabetic patients demonstrating improvement in a range of outcomes, including progression of nephropathy, cardiovascular events, and mortality, it is now an established practice to begin hypertensive patients with diabetes and without microalbuminuria on an ACE inhibitor. When microalbuminuria or more advanced stages of nephropathy is present, ACE inhibitors have been found to be effective in preventing the progression of nephropathy. The blood pressure–lowering effects of ACE inhibitors are seen by 4–6 weeks of therapy. The effects of lowering protein in the urine may be evaluated after 3 months of therapy. The UKPDS showed the beneficial effects of the ACE inhibitor captopril on diabetes-related mortality and microvascular and cardiovascular complications in patients with type 2 diabetes (17). ACE inhibitors are also effective in decreasing cardiovascular mortality and morbidity in patients with congestive heart failure and post–myocardial infarction (18). Finally, the use of the ACE inhibitor ramipril in the Heart Outcomes Prevention Evaluation (HOPE) trial resulted in a reduction in all-cause and cardiovascular mortality as well as cardiovascular events, including myocardial infarction and stroke (18). Reductions in cardiovascular end points were seen regardless of improvements in blood pressure, suggesting that ACE inhibitors have benefits that are independent of their antihypertensive effects.

Table 2.
Antihypertensive Agents and Their Effects on Adult Hypertensive Patients With Diabetes

Class	Effects on progression of renal disease	Effects on coronary events rates	Effects on stroke
First-line agents			
ACE inhibitors	Beneficial	Beneficial	Beneficial
ARBs	Beneficial	Unknown	Unknown
ß-Blockers	Beneficial	Beneficial	Beneficial
Thiazide diuretics	Unknown	Beneficial	Beneficial
Second-line agents			
NDCCBs	Beneficial	Unknown	Unknown
DCCBs	Controversial	Controversial	Beneficial
α-Blockers	Unknown	Controversial	Unknown
Loop diuretics	Unknown	Unknown	Unknown
Centrally acting adrenergic agents	Unknown	Unknown	Unknown

DCCBs, dihydropyridine calcium-channel blockers; NDCCBs, non-dihydropyridine calcium-channel blockers.

ARBs. Like ACE inhibitors, ARBs decrease proteinuria (19,20) and have been found in three recent studies (21–23) to be effective in preventing the progression of nephropathy when microalbuminuria or more advanced stages of nephropathy is present. However, cardiovascular data are limited with ARBs. They are not associated with a cough, like ACE inhibitors. In a small study, dual blockade of the renin-angiotensin system using candesartan and lisinopril (the Candesartan and Lisinopril Microalbuminuria [CALM] study) found that the combination of both agents reduced blood pressure and urinary albumin levels to a greater extent than either medication alone (24).

ß-Blockers. In clinical trials, the ß-blocker atenolol has produced reductions in proteinuria (25–27) and in the decline of the glomerular filtration rate (25) similar to those reductions seen with ACE inhibitors. In the UKPDS (17), atenolol was as equally effective as the ACE inhibitor captopril in decreasing the risk of diabetes-related end points (pooling of microvascular and cardiovascular complications) and microvascular events. ß-Blockers have also demonstrated efficacy in patients with myocardial infarction, with relative reductions in mortality of ~25% (28). There has been a long-standing concern about the effect of ß-blockers on the perception of and recovery from hypoglycemia, which may be blunted or prolonged by these agents. The UKPDS study did not show an increased incidence of hypoglycemic episodes in the group treated with ß-blockers. It is probably prudent to avoid the use of ß-blockers in insulin-using patients who have a history of severe hypoglycemia. In other patients with diabetes, especially patients with a recent myocardial infarction where the benefits are clearly proven, the benefits of ß-blockers appear to outweigh the potential risks related to hypoglycemia.

Thiazide diuretics. Thiazide diuretics may be considered first-line therapy in patients without additional cardiovascular risk factors or proteinuria. The effect of these agents on the progression of diabetic nephropathy compared with other drugs is unknown. Their efficacy in reducing the risk of stroke and congestive failure in large randomized clinical trials including subjects with mild-to-severe hypertension has been demonstrated. In the Systolic Hypertension in the Elderly Program (SHEP) study, a low-dose thiazide diuretic was shown to reduce the cardiovascular event rate by 34% compared with placebo; the absolute risk reduction was twice as great for diabetic subjects versus nondiabetic subjects (29).

Second-line agent use. If the target blood pressure goal is not obtained with the initial doses of first-line drugs, increases in doses are recommended, or the addition of a second drug from a different group should be considered. Non-dihydropyridine calcium-channel blockers (NDCCBs) can be used when ACE inhibitors, ARBs, or ß-blockers are not tolerated or are contraindicated or when a second or third drug is required. There is some evidence that NDCCBs are not as effective in preventing complications, particularly myocardial infarction, heart failure, and nephropathy. However, in studies achieving low-targeted blood pressures with substantial improvements in outcomes, dihydropyridine calcium-channel blockers (DCCBs) were commonly part of an effective multi-drug regimen that also included an ACE inhibitor or a ß-blocker, often with a diuretic.

Classes of drugs for which there are no long-term data on efficacy in improving outcomes can be used when *1*) there is intolerance to other classes, 2) there are specific indications for their use apart from treatment of hypertension (for example, α–blockers for patients with benign prostatic hypertrophy and diltiazem for rate control in atrial fibrillation), or 3) additional drugs are required to achieve the target for blood pressure.

Systolic hypertension in the elderly. In diabetic patients >65 years of age with isolated systolic hypertension (i.e., >140 mmHg systolic and <80 mmHg diastolic blood pressure), pharmacological treatment should be initiated. Earlier recommendations to treat to a systolic blood pressure <160 mmHg have been reduced based on the increased cardiovascular risk of these patients and the results of the SHEP study, in which a systolic blood pressure of 144 mmHg was achieved.

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Table 3.
Summary of Recommendations for Treating Hypertension in Adults With Diabetes

- Blood pressure should be measured at every routine diabetes visit. Patients found to have systolic blood pressure >130 mmHg or diastolic blood pressure >80 mmHg should have blood pressure confirmed on a separate day. Orthostatic measurement of blood pressure should be performed to assess for the presence of autonomic neuropathy.
- Patients with diabetes should be treated to a blood pressure of <130/80 mmHg.
- Patients with a systolic blood pressure of 130–139 mmHg or a diastolic blood pressure of 80–89 mmHg should be given lifestyle/behavioral therapy alone for a maximum of 3 months. If targets are not achieved, pharmacological therapy should be started.
- Patients with a systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg should receive drug therapy in addition to lifestyle/behavioral therapy.
- First-line agents include ACE inhibitors, ARBs, ß-blockers, or diuretics. Additional drugs may be chosen from these classes or another drug class.
- In hypertensive patients with microalbuminuria or clinical albuminuria, an ACE inhibitor or an ARB should be strongly considered. If one class is not tolerated, the other should be substituted.
- In patients over age 55 years with hypertension or another cardiovascular risk factor (history of cardiovascular disease, dyslipidemia, microalbuminuria, or smoking), an ACE inhibitor (if not contraindicated) should be considered to reduce the risk of cardiovascular events.
- In patients with a recent myocardial infarction, ß-blockers, in addition, should be considered to reduce mortality.
- In patients with microalbuminuria or overt nephropathy, in whom ACE inhibitors or ARBs are not well tolerated, a non-DCCB should be considered.
- If ACE inhibitors or ARBs are used, monitor renal function and serum potassium levels.
- In elderly hypertensive patients, blood pressure should be lowered gradually to avoid complications.
- Patients not achieving target blood pressure on three drugs, including a diuretic, and patients with severe renal disease should be referred to a specialist experienced in the care of patients with hypertension.

Hypertension in Diabetes

Continued from page 3

Combinations of agents are often required. When drug therapy is intensified, patients should be monitored carefully for adverse effects, such as orthostatic hypotension. Table 3 provides a summary of recommendations for the treatment of hypertension in adults with diabetes. ■

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Reducing Cardiovascular Morbidity and Mortality in Diabetes: Grand Rounds Clinical Education Program

Supported by an unrestricted educational grant from Merck U.S. Human Health

The American Diabetes Association's new clinical education program *Reducing Cardiovascular Morbidity and Mortality in Diabetes* was successfully presented in more than 100 hospitals throughout the fall of 2000 and the spring of 2001. Because of its favorable reviews, the program will be repeated ten times in 2002.

For a schedule of programs, visit the Association's website at www.diabetes.org/main/professional/conferences/cvd.jsp. If you would like to host this program, please contact Fran Stigliano (703-299-2096, e-mail: fstigliano@diabetes.org) for more information. ■

Make the Link!
Patient Page

High Blood Pressure and Diabetes

What is high blood pressure?

High blood pressure, also called hypertension, means that the force of the blood inside your blood vessels is too high. High blood pressure makes the heart work too hard and can increase your risk for heart attack and stroke.

What does high blood pressure have to do with diabetes?

People with diabetes are more likely to have high blood pressure. In fact, almost two out of three adults with diabetes have high blood pressure. Both high blood pressure and diabetes increase your risk of heart disease, stroke, eye problems, kidney problems, and nerve disease. So if you have both, you have an even greater risk for other health problems.

What's the target blood pressure for people with diabetes?

For most people with diabetes, keeping blood pressure below 130/80 will help prevent problems. You'll hear your blood pressure reading said as two numbers, such as "one-thirty over eighty." The first number is the pressure as your heart beats and pushes blood into the blood vessels. The second number is the pressure when your heart rests between beats.

If my blood pressure is too high, what can I do to lower it?

If you have diabetes and high blood pressure, you can take steps to lower your blood pressure.

- Use a meal plan
- Eat less salt
- Exercise
- Take blood pressure medicine

Several medicines can lower blood pressure. Some blood pressure medicines have been shown to protect your kidneys from disease and to reduce your chance for having a heart attack or stroke. Talk with your health care provider about the best medicine for you. Often, more than one medicine may be needed to lower your blood pressure.

High Blood Pressure At-a-Glance

- High blood pressure can make the heart work too hard. It raises your risk for heart disease, stroke, eye problems, kidney problems, and nerve disease.
- High blood pressure is common in people who have diabetes.
- If you have high blood pressure, talk with your health care provider about how to lower it. Meal planning, exercise, and medicines can help.

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Make the Link!
Patient Page

How will I know if my blood pressure is OK?

Have your health care provider check your blood pressure at every office visit.

How can keeping my ABCs of diabetes on target help me stay healthy?

Keeping your ABCs of diabetes on target can help you lower your risk of heart disease and stroke.

A is for A-1-C, a blood sugar check that tells you your average blood sugar for the past two to three months.
Suggested target: below 7

B is for blood pressure.
Suggested target: below 130/80

C is for cholesterol. It tells you how much of the fat that clogs blood vessels is in your blood.
Suggested LDL target: below 100

I'm not sure I can handle all this…

It's hard enough to deal with diabetes every day. Worrying about high blood pressure may make you feel overwhelmed. If this happens, talk to someone. You could call a friend or family member, or talk with someone on your health care team. Support groups can help, too. To find a support group in your area, or for more information about high blood pressure and diabetes, call the American Diabetes Association at **1–800–342–2383**.

My Health Care Professional

My Blood Pressure

Long-term goal for my blood pressure: _____

Date						
Blood pressure						

My Action Plan:

1. _____
2. _____
3. _____
4. _____
5. _____

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American Diabetes Association
1–800–DIABETES (342–2383)
www.diabetes.org

High Prevalence of the Metabolic Syndrome in the United States

ABSTRACT

Ford ES, Giles WH, Dietz WH: Prevalence of the metabolic syndrome among U.S. adults. *JAMA* 287:356–359, 2002

QUESTION

The metabolic syndrome clearly affects the development of both diabetes and cardiovascular disease. The National Cholesterol Education Program's (NCEP) revised Adult Treatment Panel (ATP III) guidelines have identified the metabolic syndrome as a secondary target for therapy, in addition to LDL cholesterol lowering, to prevent cardiovascular disease. The NCEP recommends that the diagnosis of the metabolic syndrome be made when three or more of the following risk factors are present: waist circumference >88 cm (women) or >102 cm (men), triglycerides ≥150 mg/dl, HDL cholesterol <40 mg/dl (men) or <50 mg/dl (women), blood pressure ≥130/≥85 mmHg, and fasting plasma glucose ≥110 mg/dl. Using this definition, what is the prevalence of the metabolic syndrome in the U.S.?

DESIGN, SETTING, AND PATIENTS

Analysis of NHANES III, a cross-sectional survey of a national representative sample of 8,814 individuals ≥20 years of age.

INTERVENTION

A representative sample of the noninstitutionalized U.S. population was recruited into NHANES III between 1988 and 1994. Each participant received a home interview and a medical examination.

MAIN OUTCOME MEASURES

Using the ATP III definition of the metabolic syndrome as noted above, researchers analyzed the NHANES III data to determine the prevalence of the metabolic syndrome. Participants currently taking medication(s) for hypertension and diabetes were counted as having hypertension or diabetes, respectively.

MAIN RESULTS

The age-adjusted prevalence of the metabolic syndrome was 23.7% and was similar between men (24%) and women (23.4%). The prevalence was 6.7% for participants aged 20–29 years and increased to 43.5% for participants aged 60–69 years and 42% for those ≥70 years of age (Figure 1). The highest age-adjusted prevalence was found in Mexican Americans (31.9%) compared with whites (23.8%) and African Americans (21.6%). While the prevalence of the metabolic syndrome was similar between white men and women, African American women had about a 57% higher prevalence than African American men. Among Mexican Americans, women had nearly a 26% higher prevalence than men. When applying the age-specific prevalence rates to 2000 U.S. census data, the researchers estimated that 47 million Americans have the metabolic syndrome.

CONCLUSION

The metabolic syndrome is highly prevalent in the U.S. This study highlights the urgent need for effective strategies to combat the obesity epidemic and increase physical activity levels among Americans. ■

Peripheral Arterial Disease Detection, Awareness and Treatment

ABSTRACT

Hirsch AT, Criqui MH, Treat-Jacobson D, Regensteiner JG, Creager MA, Olin JW, Krook SH, Hunninghake DB, Comerota AJ, Walsh ME, McDermott MM, Hiatt WR: Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA* 286:1317–1324, 2001

QUESTION

Peripheral arterial disease (PAD) is common and associated with a high risk for cardiovascular disease (CVD) events and death. What is the feasibility of detecting PAD using the ankle-brachial index (ABI) in primary care? Are patients with PAD receiving less aggressive treatment for CVD risk factors and are antiplatelet therapies less frequently prescribed compared with patients with other forms of CVD?

DESIGN, SETTING, AND PATIENTS

The PAD Awareness, Risk and Treatment: New Resources for Survival (PARTNERS) program, a cross-sectional study conducted at 27 coordinating centers and 350 primary care sites across the U.S. The study included 6,979 patients ≥70 years of age or aged 50-69 years with diabetes or history of cigarette smoking.

INTERVENTION

Medical history and measurement of ABI. A diagnosis of PAD was made if the ABI was ≤0.90 or there was documentation of PAD in the medical record or a history of limb revascularization. CVD was defined as a history of coronary artery disease, cerebrovascular disease, or abdominal aortic aneurysm repair.

MAIN OUTCOME MEASURES

Frequency of detection of PAD; treatment intensity of CVD risk factors and use of antiplatelet therapies in patients with PAD compared with patients with other forms of CVD/no CVD.

MAIN RESULTS

Four clinical subgroups were identified: 825 (13%) patients had PAD only, 1,040 (16%) had PAD and CVD; 1,527 (24%) had CVD only; and 47% had neither PAD nor CVD. PAD was detected in 29% (1,865) of the patients. Of these, 457 patients (55%) were newly diagnosed with PAD only and 366 (35%) were newly diagnosed with PAD and CVD. Claudication was uncommon (11%) in patients with PAD.

Patients with PAD had similar risk factor profiles as those with CVD. Smoking cessation therapy was more frequently prescribed in those with PAD than in those with CVD only. In all groups, diabetes was treated similarly. Hyperlipidemia was treated more frequently in the CVD only group (71%) compared with the prior (56%) and new PAD (44%) groups. Hypertension was treated more in the CVD only group (95%) vs. in patients with prior (88%) and new PAD (84%). Antiplatelet therapies were prescribed more in patients with CVD only (71%) than in those with new (33%) and prior PAD (54%).

CONCLUSION

PAD is highly prevalent and can be easily detected by using the ABI. A history of claudication alone is not predictive of PAD. CVD risk factors were being treated less intensively in patients with PAD vs. those with CVD only. To improve outcomes of patients with PAD, efforts to increase the diagnosis of PAD and appropriate medical interventions are necessary. ■

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ADA and ACC Survey Finds Awareness of Link Between Diabetes, Heart Disease, and Stroke Critically Lacking

A new survey of people with diabetes reveals that 68% are not aware of their increased risk for heart disease and stroke—the leading cause of death in people with diabetes. People with diabetes are also unaware of ways to reduce their risks for such serious complications, according to a survey commissioned by the American Diabetes Association and the American College of Cardiology.

On February 19, 2002, Health and Human Services Secretary Tommy G. Thompson joined the American Diabetes Association and the American College of Cardiology to discuss the need to increase awareness of the link between cardiovascular disease and diabetes and to help people with diabetes learn how to reduce their risk for developing this life-threatening complication.

"More than 16 million Americans have diabetes, and that figure is growing at an alarming rate," said Secretary Thompson. "Sixty-five percent of people with diabetes in the United States die from heart attacks or strokes. Unfortunately, most of them are not aware of the link between diabetes and heart disease and the things they can do to reduce their risks."

Approximately 68% of the people with diabetes surveyed did not consider heart attacks or stroke to be a serious complication of the disease. Additionally, people surveyed were more likely to be aware of serious diabetes complications causing disability such as blindness (65%) or amputation (36%) rather than complications that may result in premature death such as heart disease (17%), heart attack (14%) or stroke (5%).

While up to 60% of adults with diabetes have hypertension and nearly all have one or more lipid abnormality, 60% of people with diabetes surveyed do not believe they are at risk for high blood pressure or cholesterol problems. Additionally, few people with diabetes could name important methods for reducing their risk for heart attack or stroke, such as taking prescription medications (18%), lowering cholesterol (8%), quitting smoking (7%), reducing blood pressure (5%) and taking aspirin (1%).

The survey of 2,008 people was conducted by the market research firm RoperASW as part of the *Make the Link!* initiative. Interviews were conducted using random direct dial screenings of U.S. households. Results were weighted and projected to match the U.S. diagnosed diabetes patient population of 10.7 million, based on information from the National Center for Health Statistics and Centers for Disease Control. Results were weighted by age, race, sex, ethnicity, region, therapy, and length of time since diagnosis according to data derived from the National Health Interview Survey.

Efforts are certainly needed to increase awareness of the high prevalence of CVD, its risk factors and the availability of effective interventions for people with diabetes. An executive summary of the report can be found on diabetes.org/MakeTheLink. ■

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