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Keeping up-to-date with
diabetes care and education

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Abstract: The American Diabetes Association publishes standards of care that are updated annually by a panel of experts in nursing, education, behavior, psychology, nutrition, pharmacology, and medicine. This article describes current evidence-based approaches to care and education for adults and highlights revisions in the 2018 Standards of Care that are relevant to nurses and patients with type 2 diabetes.

Keywords: American Diabetes Association, diabetes, diabetes distress, diabetes self-management, diabetes standards of care, gestational diabetes, hyperglycemia, hypoglycemia, prediabetes, type 1 diabetes, type 2 diabetes

THE CDC ESTIMATES that 30.3 million people in the US have diabetes, and of those, 7.2 million are undiagnosed.[1] In addition, 84.1 million American adults have prediabetes. This means that 114 million people in the US are at risk for developing the complications of diabetes. Because diabetes and its complications are widespread, burdensome, and costly, nurses need to provide care, patient education, and support based on current evidence and recommendations.

Research in the treatment and care of diabetes is a growing and dynamic field. New medications and therapies become available each year. Research is ongoing about how to delay, prevent, and treat diabetes and prevent and treat its complications. New research findings indicate how to implement effective education, support, and healthcare; improve quality of life; and reach diverse communities.

Each year, the American Diabetes Association (ADA) publishes standards of care for patients with diabetes.[2] These standards are updated annually by a panel of experts in nursing, education, behavior, psychology, nutrition, pharmacology, and medicine. This article describes current evidence-based approaches to care and education for adults with diabetes and highlights
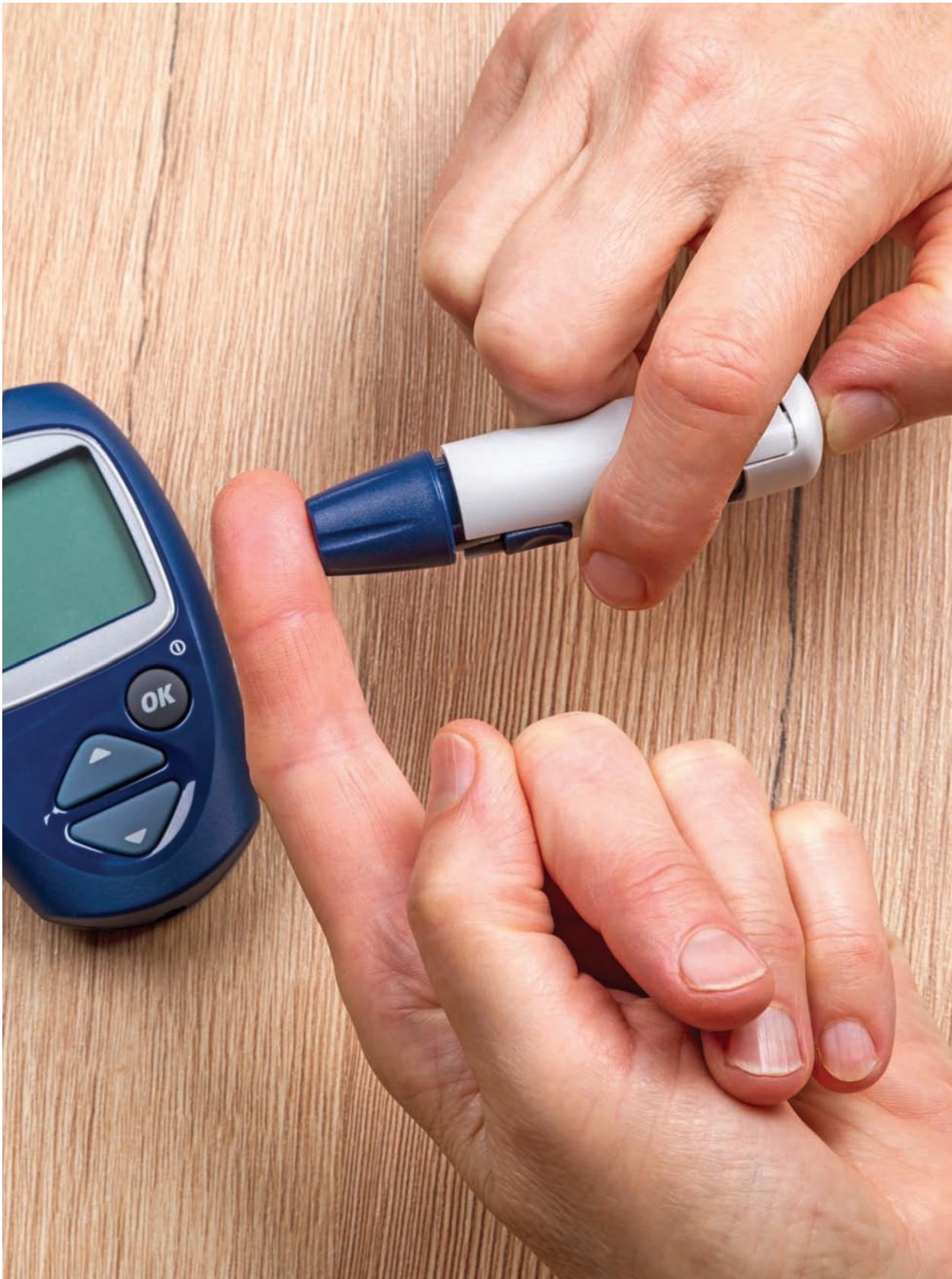
revisions in the 2018 Standards that are relevant to nurses and patients with type 2 diabetes.

Patient-centered approaches

Over the past few years, one of the most significant changes in the care of patients with diabetes has been the strong emphasis on tailoring treatment and education to meet the needs of each individual, including patient preferences, prognosis, and comorbidities.[2] The first section of the Standards of Care (Improving Care and Promoting Health in Populations) highlights critical themes to guide this care and address disparities: patient-centered collaborative care, use of evidence-based guidelines to align with the Chronic Care Model, team-based care, community involvement, and referral to needed resources.[2,3]

Treatment goals such as hemoglobin A1C (A1C) levels, weight and physical activity, and action plans to reach those goals should be created in collaboration with patients and their families based on their preferences, values, and goals. The burden of treatment and the patient's self-efficacy also should be considered, as well as the patient's social context, by assessing housing stability, food security, language barriers, finances, and community resources.[2]

When collaborating with patients, nurses need to assess each patient's:
- age
- cognition
- work and school schedule and environment
- health beliefs
- support systems
- nutritional and physical activity patterns and preferences
- social situation
- financial concerns
- family, ethnicity, cultural, and religious factors
- literacy and numeracy
- complications and duration of disease
- comorbidities and health priorities.[2]

Active listening during the assessment process can be used by the patient and the nurse to develop self-determined metabolic, behavioral, and psychosocial goals that are realistic and personally meaningful. The goals need to match both the patient's lifestyle and improve his or her health outcomes. For example, a low-income working mother may set a goal to prepare more healthful meals at home rather than eating fast food, while an older person who is newly widowed may set a goal to become involved with a diabetes support group.

Screening, prevention, and treatment

Screening

The criteria for the diagnosis of diabetes and prediabetes have not changed (see *Criteria for the diagnosis of prediabetes and diabetes*). Fasting, 2-hour plasma glucose after a 75-g glucose (oral glucose tolerance test [OGTT]) load, and A1C testing can all be used for screening, and no one test is preferred for diagnosis. However, if A1C is used, it should be done in a lab using a method certified by the NGSP and standardized to the Diabetes Control and Complications Trial assay. Do not use A1C levels for diagnosis if the patient has a condition associated with increased red blood cell turnover (such as sickle cell trait, second or third trimester pregnancy, or chronic kidney disease requiring hemodialysis). Among these patients, only plasma blood glucose testing should be used for diagnosis.[2,4]

Because both prediabetes and type 2 diabetes have a long presymptomatic period, nurses can help patients determine their level of risk through an informal assessment or a questionnaire, such as the Type 2 Diabetes Risk test (www.diabetes.org/are-you-at-risk/diabetes-risk-test). Screening is recommended for adults of any age who are overweight or obese and have one or more risk factors for type 2 diabetes.[2] (See *Risk factors for type 2 diabetes*.) All adults should be screened for diabetes starting at age 45.[2] When glucose readings are normal, the screening should be repeated at 3-year intervals. A new recommendation is that screening should also be considered for children and adolescents who are overweight or obese and have one or more risk factors for type 2 diabetes.[2]

Criteria for the diagnosis of prediabetes and diabetes[2]

Prediabetes
Fasting plasma glucose 100–125 mg/dL (5.6–6.9 mmol/L)
OR
2-h plasma glucose during 75-OGTT 140–199 mg/dL (7.8–11.0 mmol/L)
OR
A1C 5.7%–6.4% (39–47 mmol/mol)

Diabetes
Fasting plasma glucose ≥126 mg/dL (7.0 mmol/L)
OR
2-h plasma glucose ≥200 mg/dL (11.1 mmol/L)
OR
A1C ≥6.5% (48 mmol/mol)
OR
Classic symptoms of hyperglycemia, hyperglycemic crisis, random plasma glucose ≥200 mg/dL (11.1 mmol/L)

Prevention or delay of type 2 diabetes

Patients with prediabetes are at risk for diabetes and cardiovascular disease (CVD) and should be referred to an intensive diabetes prevention program that includes follow-up counseling and maintenance.[2,5] They should also be screened and treated for modifiable CVD risk factors.

In-person programs based on the Diabetes Prevention Program (DPP), certified or recognized diabetes self-management education and support (DSMES) programs, and technology-based programs can be useful to achieve and sustain the weight loss (7% of body weight) and exercise (150 min/week of moderate intensity) recommendations needed to lower the risk of diabetes.[2,6] Recent studies support behavioral and content delivery through virtual small groups, internet-driven social networks, cell phones, wireless weight scales, pedometers, and other mobile internet-enabled devices.[7,8] The CDC has begun to certify electronic and mobile health programs as effective DPP interventions.[6]

There is no specific "diet" for diabetes prevention; however, weight loss is key. In addition, nutrition plans rich in monounsaturated and polyunsaturated fats (such as the Mediterranean diet) may delay or prevent diabetes.[8,9] A healthful diet incorporating whole grains, nuts, dairy, and berries, as well as limiting red meat, added sugar, and sugar-sweetened beverages, may also be helpful.[2,10-12] Moderate exercise, such as brisk walking, can improve insulin sensitivity and reduce abdominal fat, and is beneficial as part of a prevention program.[13]

Metformin should also be considered for patients with prediabetes, especially those with a body mass index (BMI) of 35 or greater, under age 60, and women with a history of gestational diabetes.[5]

Risk factors for type 2 diabetes[30]

Individuals are more likely to develop type 2 diabetes if they:
- have a family history of diabetes (first-degree relative)
- are overweight or obese
- are age 45 or older
- are Black, Alaska Native, Native American, Asian American, Hispanic, Native Hawaiian, or Pacific Islander
- have hypertension
- have a low serum high-density lipoprotein cholesterol level, or a high serum triglyceride level
- have a history of gestational diabetes or gave birth to a baby weighing 9 lb or more
- are not physically active
- have a history of heart disease or stroke
- have a history of depression
- have polycystic ovary syndrome
- have acanthosis nigricans (velvety, hyperpigmented plaques on the skin, especially intertriginous sites such as the neck and axillae).

Treatment of type 2 diabetes

Due to the progressive nature of type 2 diabetes, treatment occurs in stages beginning with lifestyle interventions including referral to a formal DSMES program. Medication therapy begins with monotherapy, most often metformin. Assessing and addressing healthful eating, weight management, physical activity, self-determined behavioral goals, and psychological and social needs are essential elements that should be provided by nurses at each stage of therapy.[2,14] Both drug-specific and patient factors should be considered and discussed as part of patient-provider shared decision-making when prescribing and advancing antihyperglycemic treatment. These factors include efficacy, safety, risk for hypoglycemia and other adverse reactions, weight change, cardiovascular effects, renal effects, costs, and route of administration.[2]

Additional medications including insulin or other injectables (alone or in combination) are added as needed to achieve the A1C target chosen in collaboration with the patient.[15] One area that has been given more emphasis in the 2018 ADA Standards of Care is the prevention and management of CVD. Among patients with diabetes and CVD, adding agents that will reduce cardiovascular events and mortality (such as empagliflozin or liraglutide) is recommended.[2,16] The effect of glucose-lowering medications on weight should be considered for overweight and obese patients. Measurement of B12 levels should be considered for patients who take metformin, especially those with anemia or peripheral neuropathy.[2]

Although an A1C goal of 7% or less is recommended for most adults, patient-specific and disease factors are used to determine higher or lower personal goals. Optimal target glucose recommendations are a preprandial capillary plasma glucose level of 80 to 130 mg/dL and a peak postprandial plasma glucose level of 180 mg/dL. Personal targets are based on self-management preferences, capacities, and personal goals; available support systems and resources; risk for hypoglycemia; disease duration; life expectancy; severity of comorbidities; and presence of vascular complications.[2,15] For example, an otherwise healthy adult newly diagnosed with diabetes and a strong support system might choose more stringent targets than an older adult with long-standing diabetes, one or more comorbidities, and limited support.

Self-management and psychosocial issues

All patients should be referred for DSMES and medical nutrition therapy (MNT) and receive ongoing assessment of educational, dietary, and psychosocial issues, and the need for support.[2]

DSMES

In accordance with the National Standards for Diabetes Self-Management Education and Support, all patients with diabetes should take part in DSMES to obtain the knowledge, skills, and ability to participate in self-management and ongoing support to implement and sustain these behaviors.[2,17] Four critical times to assess and refer patients for DSMES are at diagnosis, annually, when complicating factors arise, and when transitions in care occur.[2,18]

DSMES can be provided in individual or group settings, as well as through internet-based services.[2,17] Regardless of format, it should be patient-centered and patient-driven; address the clinical, behavioral, and emotional aspects of diabetes; and be responsive to individual questions, concerns, preferences, needs, and values.[2,14] This means that both care and education are less directive, and nurses should use patient-centered communication styles (such as open-ended questions, active listening, self-directed goal setting, and assessing emotional concerns) focused on helping patients with diabetes and their family members design a management program that works not only for their diabetes, but also for their lives.[14,17,19] For example, beginning an educational or clinical assessment by asking patients what is hardest for them about managing diabetes, what questions they have, and how they are coping with the demands of diabetes are ways to assess their needs and perceptions so these can be addressed at the beginning of the DSMES or clinical encounter.[14]

Do not use A1C levels for diagnosis if the patient has a condition associated with increased red blood cell turnover.

MNT

The ADA does not endorse a standardized or "ideal" meal plan or percentages of macronutrients for patients with diabetes.[2] MNT is instead based on diabetes medications, other therapies, and patient and family preferences, rather than a standard "diabetic" or "ADA diet."[2,12,20] Modest and sustained weight loss has been shown to improve glycemia among patients with type 2 diabetes and reduce the need for medications.[2,12] Improvements related to weight management are most likely to occur early in the course of diabetes when insulin secretory ability is relatively intact. Reducing calories is the key to weight loss, with similar outcomes for meal plans that reduce fat, carbohydrates, or protein.[2]

The ADA 2018 Standards of Care highlight the importance of addressing psychosocial concerns and self-directed goal setting and other behavioral change efforts.[2,14] It is recommended that all patients with diabetes be routinely screened for depression, diabetes distress (a common and significant psychological reaction to diabetes related to the burden of daily self-management demands, the emotional burden of caring for a serious and complex disease, and the anxiety of the potential or actuality of disease progression), anxiety, eating disorders, and cognitive impairment.[2,22] Because it is so common and has an independent negative effect on outcomes among people with diabetes and their family members, diabetes distress needs to be assessed and addressed.[2,20,21] Prevalence rates of diabetes distress range from 18% to 45%, with an incidence of 38% to 48% over 18 months. High levels of distress (such as guilt, anger, frustration, fear, and burnout) have been linked with elevated A1C levels, lower self-efficacy, and poorer dietary, exercise, and medication-taking behaviors.[22]

Obesity management

The management of obesity among patients with type 2 diabetes is an important part of diabetes treatment.
• A BMI of less than 25 kg/m^2 is defined as normal (less than 23 kg/m^2 among Asian Americans)
• A BMI of 25 to 29.9 kg/m^2 is defined as overweight (23.0-27.4 kg/m^2 among Asian Americans)
• A BMI of 30 to 40 kg/m^2 is defined as obese (27.5 to 37.4 kg/m^2 among Asian Americans)
• A BMI over 40 kg/m^2 is defined as extremely obese (over 37.5 kg/m^2 among Asian Americans).[2]

MNT, physical activity, and behavioral, pharmacologic, and surgical interventions are recommended strategies for obesity management.[2] Patient engagement in meal planning is critical for weight loss. MNT, physical activity planning, and behavioral strategies designed to achieve a 5%

weight loss should be offered to all overweight and obese adult patients who indicate a desire and readiness to lose weight.[2] Approved weight loss medications may be offered to patients with a BMI of 27 kg/m^{2} or greater. Bariatric surgery may be considered by patients with type 2 diabetes and a BMI of 35 kg/m^{2} or greater; this treatment may result in normalization of glucose levels.[23]

Diabetes and pregnancy

Recommendations are provided for women with type 1 or type 2 diabetes before pregnancy (pregestational diabetes), gestational diabetes, and general principles for diabetes management in pregnancy. A recommendation of interest to nurses is the importance of assessing the need for and providing preconception counseling at every opportunity for women of childbearing age with type 1 and type 2 diabetes. Areas to address include family planning, discussing pregnancy plans with her provider, and achieving an A1C of 6.5% or less before becoming pregnant.[2]

Glycemic targets for pregnant women with type 1, type 2, and pregestational diabetes are:
• Fasting, 95 mg/dL (5.3 mmol/L) or less
• 1-hour postprandial, 130 mg/dL (7.8 mmol/L) or less
• 2-hour postprandial, 120 mg/dL (6.7 mmol/mol) or less.[2,24]

A target A1C of 6.0% to 6.5% is recommended, but less than 6% may be optimal if it can be achieved without hypoglycemia. Less stringent targets (less than 7%) may be recommended for women who experience significant hypoglycemia.[2]

Insulin is the preferred treatment for management of both type 1 and type 2 diabetes during pregnancy, although metformin and glyburide may also be used.[2] Women with both type 1 and type 2 diabetes should be prescribed low-dose aspirin, unless contraindicated, from the end of the first trimester until the baby is born to lower the risk of preeclampsia.[25]

Complications and other comorbidities

Macrovascular complications

Both the prevention and treatment of acute and long-term complications of diabetes remain a significant focus. The BP recommendation remains at 140/90 mm Hg, although multiple drug therapy may be required to reach this target. It may be appropriate to aim for a BP of 130/80 mm Hg for certain patients (such as younger patients or those with albuminuria or other cardiovascular risk factors) if it can be obtained without significant treatment burden.[2] The recommended first line of treatment for hypertension is either an angiotensin-converting enzyme inhibitor or an angiotensin receptor blocker at the maximally tolerated dose. Because these reduce the effect of the hormone angiotensin II that is most active during sleep, it is preferable to take them at bedtime.[2] Older adults should also be treated for hypertension. A new recommendation is that all patients with hypertension should monitor their BP at home.[26]

Lifestyle and moderate statin therapy is recommended for adults with diabetes age 40 or over without atherosclerotic cardiovascular disease (ASCVD), including older adults with an intermediate life expectancy.[2] High-intensity statin therapy should be added to lifestyle therapy for all patients with ASCVD. Patients under age 40 with additional ASCVD risk factors should consider moderate-intensity statin therapy. Lifestyle management and optimal glycemic control are also recommended for patients with serum triglyceride levels of 150 mg/dL and over and/or a low high-density lipoprotein cholesterol level (under 40 mg/dL for men; under 50 mg/dL for women). A recent systematic review indicated that statins do not have an adverse effect on cognition.[27]

Aspirin (75 to 162 mg/day) may be considered as a primary prevention for all patients with diabetes who are at increased cardiovascular risk.[2] This includes most adults with diabetes over age 50 who have at least one other risk factor and are not at risk for bleeding.

Microvascular complications

Optimal blood glucose and BP levels are still recommended to lower the risk and slow progression of kidney disease and retinopathy.[2] Either laser retinal photocoagulation or intravitreal antivascular endothelial growth factor injections can be used to protect vision among patients with proliferate diabetic retinopathy.[28] Aspirin therapy does not increase the risk of retinal hemorrhage among patients with retinopathy.[2]

Assess signs and symptoms of both diabetic peripheral neuropathy and autonomic neuropathy. Either pregabalin or duloxetine are recommended as initial therapy for neuropathic pain.[2] Provide general preventive foot self-management care to all adults with diabetes.

Acute complications

The alert blood glucose level for hypoglycemia is 70 mg/dL or less.[2,29] The preferred treatment is 15 to 20 g of fast-acting glucose (such as glucose tablets), although any type of fast-acting carbohydrate that contains glucose is acceptable. Treatments that contain fat may delay the glycemic response. Among patients with type 2 diabetes, carbohydrate sources high in protein should not be used to treat or prevent hypoglycemia.[2] Protein can increase insulin production without raising the level of glucose. Once the blood glucose level has returned to normal, a meal or snack may be needed. Teach patients to wear diabetes identification and carry a readily available source of glucose.

Illness or other stressful events may raise glucose levels and lead to diabetic ketoacidosis in patients with type 1 diabetes or to a hyperosmolar hyperglycemic state in patients with type 2 diabetes.[2] Both of these complications are life-threatening and require immediate treatment. Review sick-day strategies with patients and emphasize the need to obtain recommended immunizations.

Hospital and long-term care

The guidelines for hospitalized patients, either newly diagnosed or with long-standing diabetes, have not changed. Insulin therapy should be initiated at a threshold of 180 mg/dL with a target range of 140 to 180 mg/dL.[2] Basal insulin plus a bolus correction dose is the preferred treatment; the sole use of sliding scale insulin is strongly discouraged. Of interest to nurses is the focus on discharge planning: medication reconciliation, transition care, communication, and follow-up. Along with a referral for DSMES and MNT, review blood glucose monitoring; when to contact the healthcare provider; the recognition, treatment, and prevention of hypoglycemia; hyperglycemia and sick-day management; consistent use of medications; and consistent timing of meals.[2,17]

Special populations

The sections of the 2018 Standards of Care related to children and adolescents have been expanded to capture the nuances of care and DSMES specific for these populations, such as diabetes management in child-care settings and at school.[2] An A1C goal of less than 7.5% is recommended across all pediatric groups. Nurses, parents, and other healthcare professionals should prepare young adults for the transition to adult healthcare and self-management.

Three recommendations that were added to the 2018 Standards of Care highlight the need to individualize

A new recommendation in the 2018 Standards of Care is that all patients with hypertension should monitor their BP at home.

pharmacologic therapy for older adults in order to reduce the risk of hypoglycemia, avoid overtreatment, and simplify complex treatment plans.[2] Older adults who are otherwise healthy with intact cognitive function and functional status should have lower glycemic goals than those with multiple health and functional impairments, especially patients who reside in long-term-care facilities. Meal plans need to be flexible and tailored to personal choices, preferences, culture, and personal goals for patients with diabetes in long-term-care facilities and in end-of-life care.

Patient education is the key

Because of the increasing number of individuals with diabetes in both the US and throughout the world, most nurses are likely to encounter many patients with diabetes regardless of their specialty or work situation.

Whether in the community, an outpatient specialty, primary care setting, or hospital, providing quality diabetes education and ongoing support and care is a role that most nurses must be prepared to assume. Although referral to a comprehensive DSMES program is essential, providing information and ongoing support also needs to occur informally using "teachable moments" and answering questions and concerns raised by patients with diabetes and their family members.

Providing self-management education and addressing psychosocial issues are critical elements of both diabetes care and nursing practice. Regardless of technology or new treatments, nurses must never lose sight of their roles as patient advocate and supporter. ■

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