IDENTIFYING AND MANAGING THE PSYCHIATRIC PATIENT AT RISK FOR TYPE 2 DIABETES*

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**ABSTRACT**

The prevalence of diabetes in the mentally ill may be up to 3 times that in the general population (already at epidemic levels). Antipsychotic medications are responsible for only part of this increased prevalence. Many antipsychotic drugs are associated with significant and rapid weight gain, but weight gain is not completely responsible for the propensity toward diabetes with these medications. The severely mentally ill are prone to unhealthy lifestyles, overweight/obesity, and diabetes. The increased risk of diabetes in these patients and the health hazards that diabetes imposes cannot be overstated or overlooked. Although the severely mentally ill have numerous lifestyle factors that contribute to their propensity for weight gain and diabetes, these lifestyle factors are modifiable. Results from the Diabetes Prevention Program show that diabetes can be prevented with lifestyle interventions. Incorporating healthy lifestyle changes for mentally ill patients requires simple, concrete messages, with visual cues and solutions to common complaints. Clinical management of weight gain should include nutritional education, close monitoring of weight, early intervention if rapid weight gain is observed, and implementation of behavioral strategies.


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*Based on a presentation given by Ms Valentine at a roundtable meeting held in Baltimore, Maryland, December 2003.
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First, the rate of diagnosed diabetes in people with schizophrenia far exceeded that in the general population (more than triple) prior to the introduction of atypical antipsychotic medications. This supports the greater propensity toward diabetes among those with severe mental illness. The study authors also noted that the risk factors for diabetes among those with schizophrenia were similar to those found in the general population (ie, African American ethnicity, female sex, older age, lower educational attainment). Several hypotheses have been proposed to explain this phenomenon, including poor diet and lower exercise rates among the mentally ill and perhaps genetic or metabolic predisposition toward weight gain. The results of the second study shown in Figure 1 show that atypical antipsychotic drugs increase the risk of diabetes compared with conventional agents. While the difference between these 2 groups of patients was statistically significant, it is dwarfed by the elevated risk among all patients with schizophrenia shown in the first study. The high prevalence of diabetes among the severely mentally ill cannot be attributed to atypical antipsychotic medications alone, but these drugs do significantly exacerbate an already dangerous health status. As a result, diabetes or related conditions are reported as an adverse event in labeling for divalproex and lithium as well as with atypical antipsychotic drugs.

How prevalent is diabetes among the general population? The American Diabetes Association (ADA) has recently updated their statistics: up to 18 million people in the United States have diabetes, with about one third of cases remaining undiagnosed. The ADA also estimates that an additional 20 million people have prediabetes, a term now used to describe impaired fasting glucose or impaired glucose tolerance (Table 1). In 2000, the ADA predicted the prevalence of diabetes would reach 17.5 million in North America by 2010 (Figure 2). In 2003, we already reached that figure. Although we often hear about obesity and diabetes in the United States, these diseases are clearly not unique to Americans, with even larger increases in the prevalence of diabetes in Asia and Africa than North America, in part due to their adoption of the Western lifestyle.

### Table 1. Defining Diabetes and Prediabetes

<table>
<thead>
<tr>
<th></th>
<th>Fasting Plasma Glucose (Preferred)</th>
<th>Casual Plasma Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>≥126 mg/dL</td>
<td>≥200 mg/dL + symptoms OR 2-hour postload glucose ≥200 mg/dL</td>
</tr>
<tr>
<td>Prediabetes (IFG, IGT)</td>
<td>100-125 mg/dL</td>
<td>IGT, OGTT = 2-hour postload glucose ≥140-199 mg/dL</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt;100 mg/dL</td>
<td>2-hour postload glucose &lt;140 mg/dL</td>
</tr>
</tbody>
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IFG = impaired fasting glucose; IGT = impaired glucose tolerance; OGTT = oral glucose tolerance test.

CAN DIABETES BE PREVENTED?

A landmark study was recently conducted to determine if therapeutic lifestyle changes or metformin could be used to prevent diabetes. A total of 3234 people with impaired glucose tolerance were randomly assigned to one of 3 treatment groups: lifestyle changes, metformin 850 mg daily, or placebo. Those who were assigned to lifestyle changes were asked to lower their body weight by 7% by lowering intake of fat and calories and exercising 150 minutes per week at moderate intensity. (Most chose walking an average of 30 minutes per day, 5 days per week.) Those receiving metformin or placebo also received information on diet and exercise.17

The study group reflected many cross-sections of Americans (mean age, 51 years; range, 25 to 85 years). Minority groups (American Indians, African Americans, Hispanics, Asian Americans, and Pacific Islanders) composed 45% of the study population. The average body mass index was 34 kg/m².17

The results from the placebo group were consistent with other prevalence studies; 11% progressed to diabetes after 1 year in the study (Figure 3)—ie, when no medication or lifestyle interventions were incorporated. In the metformin group, 7.8% progressed to diabetes, representing a 31% reduction in those who progressed to diabetes. However, those in the diet and exercise group fared best. Only 5% progressed to diabetes, representing a 58% reduction in diabetes development. The study was stopped early because of the significant impact of metformin and lifestyle interventions. This study clearly shows the benefits of intervention because it is much easier to treat a patient with impaired fasting glucose than one with diabetes.17

Interestingly, lifestyle intervention was equally effective in men and women and all ethnic groups. It also was effective in patients aged 60 years and older, who generally have a 20% prevalence of diabetes. Metformin was effective in both men and women and all ethnic groups but not in older volunteers or those less overweight. Thus, lifestyle interventions are inexpensive and not sex- or race-specific.

IMPLEMENTING LIFESTYLE INTERVENTIONS TO PREVENT DIABETES IN THE MENTALLY ILL

Studies have shown significant and rapid weight gain with atypical antipsychotic medications. One study showed an average weight gain of about 3 kg (6.6 lb) after 10 weeks of treatment with olanzapine and more than 5 kg (11 lb) by 30 weeks.18 It is important for both patients and nurses to understand how few extra calories can cause a 10-lb weight gain. Human overfeeding studies indicate that consumption of 8 kcal extra per day
results in an extra 1 g body weight. Thus, gaining 4 to 4.5 kg over 10 weeks is achieved by only an extra 460 to 520 kcal per day. This can easily be acquired through 1 candy bar and a 20-oz soda.

Clinical management of weight gain should include 4 essential elements: nutritional education, close monitoring of weight, early intervention if rapid weight gain is observed, and implementation of behavioral strategies. Nutritional information benefits all mentally ill patients, not only those susceptible to weight gain. Monitoring weight is essential to preventing or blunting weight gain with antipsychotic medications. Some facilities, however, do not have a scale, and some patients are very sensitive to being weighed, particularly if the scale is in a public place as it is in many doctor’s offices. Some patients may even avoid a clinic visit to avoid being weighed. There are several ways to monitor weight gain, however. Some patients monitor their clothing size or how their clothing is fitting. The waist can also be measured more discreetly in the examination room. Waist circumference is important, as it is a defining component of the metabolic syndrome; patients with abdominal adiposity (the “apple-shaped” patients) are at much higher risk for obesity-related cardiovascular diseases. Early intervention is important because it is much easier to prevent weight gain or to lose 5 lb than to face the enormous task of losing 50 lb. Even if some weight is gained, lifestyle interventions play an important role in attenuating weight gain and supporting a healthier lifestyle overall.

Several clear risk factors for diabetes have been identified (see Sidebar in Ms Littrell’s article, page 107). In particular, acanthosis nigricans refers to an increased pigmentation and tissue growth in creases of the neck, axilla, and groin. It is especially notable (ie, more prominent and more prevalent) in people of color and usually indicates a high insulin level and increased risk for type 2 diabetes. Polycystic ovarian syndrome is also common and should be assessed for in women of childbearing age on metformin therapy. Treatment with metformin can reverse this syndrome and thus reverse the associated infertile state. Mental illness is also recognized as an important risk factor for diabetes. For this reason alone, mentally ill patients should be screened for diabetes.

Table 2 outlines the recommended procedures for assessment and tracking of diabetes. Importantly, the ADA recently lowered its threshold for impaired glucose tolerance (prediabetes) from a fasting blood glucose level of 110 mg/dL to 100 mg/dL. Although the ADA recommends fasting blood glucose levels over casual plasma glucose levels, some institutions prefer the latter because the results are easier to obtain. Impaired fasting glucose or diabetes is diagnosed with 2 different days of elevated fasting glucose levels or post glucose challenge.

As with obesity management, incorporating healthy lifestyle changes for mentally ill patients

| Table 2. Recommended Procedures for Assessing and Tracking Diabetes |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| **Assessment**              | Baseline                   | Follow-up                   | Ongoing                     |
| Fasting blood glucose*      | X                           | Every 3 months for 1 year   | Annually                    |
| Blood pressure              | X                           | Every 3 months              | Annually                    |
| Weight                      | X                           | Every visit                 | Every visit                 |
| Lifestyle: drinking water   | X                           | Every visit                 | Every visit                 |
| food choices                |                             |                             |                             |
| Physical activity           | X                           | Every visit                 | Every visit                 |

*For elevated fasting blood glucose (100-125 mg/dL), refer to Certified Diabetes Educator for nutrition and lifestyle counseling. For fasting blood glucose >126 mg/dL, referral for diagnosis and management is appropriate.

Data from Wirshing et al, Luna et al.
requires simple concrete messages, such as drinking 8 glasses of water per day, eating 3 meals per day (or more but smaller meals), avoiding (and defining) junk food, reviewing appropriate portion size, and increasing physical activity up to 30 minutes per day, at least 5 days per week (see Sidebar on previous page). Water intake does not have to be strictly through water consumption. Diet drinks, such as diet juice mixes or sodas, also contribute to water consumption goals. Importantly, the food pyramid from the US Dietary Association may not be easily understood by mentally ill patients. For example, a patient may think that fats and sweets are the most important food group because they are at the top of the pyramid. Also, the concept of portions and the recommended number of servings can be very misleading, even for the average person. Visual examples of 1 cup or 1/2-cup servings are critical (e.g., cupped hands equal about a 1-cup serving). Also, the quality of food is important. Diabetes educators do not consider 1/2 cup of fruit juice an equivalent to 1 piece of fruit, because juices will often raise blood sugar levels to the same extent as sodas. The value of the fiber and slower ingestion is important.

A common complaint among patients and their caregivers is that they cannot afford to eat more healthily. Most vegetables are very inexpensive; the challenge is in learning how to prepare them. Simple recipes and the use of frozen vegetables are useful solutions.

The ADA recommends screening for diabetes at baseline, after 3 months, and then annually as outlined by Dr. Petty (pg 87, Table 4) and in the Sidebar on this page.22 Each screening is also an opportunity to reinforce messages promoting healthy lifestyle activities. If diabetes is diagnosed and medication is administered, the patient should be referred for diabetes education and glucose monitoring should be initiated as well as goals for control at every visit. Importantly, thiazolidinediones are important medications to control diabetes but may lead to weight gain, which can complicate overall health goals. Monitoring should also include quarterly primary care visits, blood pressure check, glycosylated hemoglobin (HbA1c) levels (goal, <6.5% or 7%), and a foot examination for neuropathy or circulatory impairment. Yearly examinations should include an eye examination for retinopathy, microalbuminuria testing, lipid profile, a reevaluation of self-management skills, and immunizations.
REFERENCES


