Psychosocial Issues for People with Diabetes

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Objectives

- Provide epidemiological and interventional data of DM in AI/AN and general population
- Briefly review the current understanding of diabetes development and treatment
- Discuss the bidirectional association of psychosocial and behavioral issues with diabetes
- Identify the challenges of diabetes management in patients with psychiatric illnesses and psychosocial disorders
Diabetes mellitus is a chronic disorder of abnormal fuel metabolism that results in high blood glucose levels.
After eating, most food is turned into glucose, the body’s main source of energy.
How Food is Digested

1. Food digestion starts with chewing

2. Stomach acids break down food

3. Pancreas releases digestive enzymes

4. Carbohydrates, Fats, Protein
   Glucose

5. Glucose enters bloodstream

6. Pancreas releases insulin

- Χαρβα, Φατς, Πρωτειν
- Γλυκοσε
- Ινσολιν

- Χαρβοηψδρατς χονσερτεδ το γλυκοσε
- Πανχρεας ρελεασες διγεστιες ενζυμες
- Πανχρεας ρελεασες ινσολιν
- Γλυκοσε εντερος βλοοδστρεαμ
Normal Blood Glucose Control: No Diabetes

Glucose stays in a healthy range

Insulin from the pancreas is released at the right times and in the right amounts

Insulin helps glucose in the blood enter cells
High Blood Glucose (Hyperglycemia): Diabetes

Blood glucose builds up for several possible reasons…

Too little insulin is made
Cells can’t use insulin well
Liver releases too much glucose
Symptoms of Hyperglycemia

- Increased urination
- Increased thirst
- Blurry vision
- Feeling tired
- Weight loss
- Slow healing of cuts or wounds
- More frequent infections
- Many times; no symptoms at all
Hyperglycemia Can Cause Serious Long-Term Problems

Chronic complications of diabetes

- Blindness
- Kidney disease
- Nerve damage
- Amputation
- Heart attack
- Stroke
Criteria for the Diagnosis of Diabetes

A1C ≥6.5%

OR

Fasting plasma glucose (FPG) ≥126 mg/dL (7.0 mmol/L)

OR

2-h plasma glucose ≥200 mg/dL (11.1 mmol/L) during an OGTT

OR

A random plasma glucose ≥200 mg/dL (11.1 mmol/L)
An Important Test: A1c level or Average Blood Glucose Concentration (eAG)

Diagnostic Criteria:
- <5.7%
- ≥6.5%

Treatment Goal:
- <7.0%

Table:
<table>
<thead>
<tr>
<th>HbA1c Level (%)</th>
<th>Average Blood Glucose (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>360</td>
</tr>
<tr>
<td>13</td>
<td>333</td>
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<tr>
<td>12</td>
<td>300</td>
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<td>11</td>
<td>270</td>
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<td>10</td>
<td>240</td>
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<td>9</td>
<td>210</td>
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<td>8</td>
<td>180</td>
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<td>7</td>
<td>150</td>
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<tr>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>5</td>
<td>80</td>
</tr>
</tbody>
</table>
Two Main Types of Diabetes

**Type 1 diabetes**
Pancreas makes too little or no insulin
Most people are under age 20 when diagnosed
Insulin is always needed for treatment

**Type 2 diabetes**
Cells do not use insulin well (insulin resistance); ability for pancreas to make insulin decreases over time
Most people are over age 40 when diagnosed, but type 2 is becoming more common in younger adults, children and teens
Type 2 is more likely in people who: Are overweight; Are non-Caucasian; Have a family history
Treating High Blood Glucose (Hyperglycemia)

Too little insulin is made

Cells can’t use insulin well

Liver releases too much glucose

Other ways to lower BS levels

Stimulate the pancreas; or use insulin

Reduce insulin resistance

Metformin; GLP-1 agonist

Reduce kidney glucose reabsorption
Steps to Lower Risk of Diabetes Complications

- A1C < 7
- Blood pressure < 140/80
- Cholesterol (LDL) < 100, statin therapy for high risk
- Get help to quit smoking
- Be active
- Make healthy food choices
- Take care of your feet
- Get recommended screenings and early treatment for complications
Number and Percentage of U.S. Population with Diagnosed Diabetes, 1958-2015

Diabetes Facts in the United States

- 29.1 million people in the U.S. have diabetes
  - 8.1 million people with diabetes are undiagnosed
  - 9.3% of the U.S. population
- 1.9 million Americans aged 20 years or older were newly diagnosed with diabetes in 2010

Source: National Diabetes Fact Sheet, 2014
Recent data show that the rate of increase in diabetes prevalence is slowing in AI/AN adults (aged 20 and older), climbing only from 15.2 percent to 15.9 percent from 2006 through 2012. This trend, plus the continued rise in the U.S. prevalence rate during those years, narrowed the gap in prevalence rates between AI/AN adults (15.9 percent) and U.S. adults (11.7 percent) in 2012.
From 1980 to 2014, the number of adults in the United States aged 18–79 with newly diagnosed diabetes more than tripled from 493,000 in 1980 to more than 1.4 million in 2014. From 1991 to 2009, the number of new cases of diabetes increased sharply from 573,000 to more than 1.7 million. However, from 2009 to 2014, the number of new cases decreased significantly to approximately 1.4 million.
Changes in Diabetes-Related Complications in the United States, 1990-2010

Figure 1. Trends in Age-Standardized Rates of Diabetes-Related Complications among U.S. Adults with and without Diagnosed Diabetes, 1990–2010.
### Changes in Diabetes-Related Complications in the United States, 1990-2010

**Table 3. Age-Standardized Rates of Diabetes Complications and the Relative Risk of Complications, According to the Presence of Diabetes, United States, 1990, 2000, and 2010.**

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Acute myocardial infarction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults with diabetes</td>
<td>–67.8</td>
<td>–67.8</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults without diabetes</td>
<td>–31.2</td>
<td>–31.2</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults with diabetes</td>
<td>–52.7</td>
<td>–52.7</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults without diabetes</td>
<td>–5.5</td>
<td>–5.5</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td></td>
<td></td>
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<tr>
<td>Lower-extremity amputation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults with diabetes</td>
<td>–51.4</td>
<td>–51.4</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among adults without diabetes</td>
<td>–12.9</td>
<td>–12.9</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End-stage renal disease</td>
<td></td>
<td>–28.3</td>
</tr>
<tr>
<td>Among adults with diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td>–28.3</td>
<td></td>
</tr>
<tr>
<td>Among adults without diabetes</td>
<td></td>
<td>65.0</td>
</tr>
<tr>
<td>no. of events/10,000 (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The relative risk was calculated as the age-adjusted rate among adults with diabetes divided by the age-adjusted rate among adults without diabetes. The relative risk was not calculated for death from hyperglycemic crisis, which by definition occurs only in persons with diabetes.*

Findings reflect a combination of advances in acute clinical care, improvements in the performance of health care system, and health promotion efforts directed at patients with diabetes.

Conclusion: Rate of diabetes-related complications declined substantially in the past 2 decades, but large burden of diabetes persists because of increase in the prevalence of disease.
Figure 8. Incidence Rates of ESRD due to Diabetes, by Race

Source: United States Renal Data System 2013
Risk Factors for Type 2 Diabetes

- Obesity
- Body fat distribution
- Family history of diabetes
- Physical inactivity
- Race/ethnicity
- Smoking
- Age
- Previous gestational diabetes (GDM)
- Elevated glucose levels
- Metabolic Syndrome
- Women with PCOS
- Medications
## British Association of Psychopharmacology Guidelines: Antipsychotic drug treatment

### Table 2. Rank order of liability for weight gain among oral antipsychotic drugs.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Risk of weight gain</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olanzapine</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td>Clozapine</td>
<td>High</td>
<td>2</td>
</tr>
<tr>
<td>Chlorpromazine</td>
<td>High/medium</td>
<td>3</td>
</tr>
<tr>
<td>Quetiapine</td>
<td>Medium</td>
<td>4, 5</td>
</tr>
<tr>
<td>Risperidone</td>
<td>Medium</td>
<td>4, 5</td>
</tr>
<tr>
<td>Paliperidone</td>
<td>Medium</td>
<td>4, 6</td>
</tr>
<tr>
<td>Asenapine</td>
<td>Low</td>
<td>7</td>
</tr>
<tr>
<td>Amisulpride</td>
<td>Low</td>
<td>7</td>
</tr>
<tr>
<td>Aripiprazole</td>
<td>Low</td>
<td>7</td>
</tr>
<tr>
<td>Lurasidone</td>
<td>Low</td>
<td>7, 8</td>
</tr>
<tr>
<td>Ziprasidone</td>
<td>Low</td>
<td>7, 8</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>Low</td>
<td>8</td>
</tr>
</tbody>
</table>

Clinical metabolic syndrome and atypical antipsychotic medications

Addressing Population Health

Guidelines are key to improving population health and reducing disparities, but for optimal outcomes, diabetes care must be individualized, “patient-centered care”

- Care Delivery System- targeted goal and guidelines
  - Optimizing Provider and Team Behavior
  - Support Patient Self-Management
  - Change the Care System: address all comorbidities including psychosocial issues

Guidelines are key to improving population health and reducing disparities, but for optimal outcomes, diabetes care must be individualized, “patient-centered care”

- Chronic Care Model
  - Delivery system design: need “proactive not reactive model”, a team based approach
  - Self-Management support: resources
  - Decision support: evidence-based rationale
  - Clinical information system: EHR/registries
  - Community resources and policies: support healthy lifestyle
  - Health System: create quality-oriented culture

Diabetes Mellitus is:

- a life-long “chronic” and insidious disease
- a self-care disorder; inattention has severe consequences
- impacted by beliefs, attitudes, and behaviors which are influenced by cultural factors requiring changing patterns of eating, physical activity and other culturally embedded behaviors (Fitzgerald, et al., 2000)
- managed successfully through a committed partnership between healthcare providers and patients and patient’s family

Psychosocial and Behavioral Definition of Diabetes
Patient Involvement for Hyperglycemia Management

- Responsive and engage (patient or family member)
- Participates in Self-management (monitoring SMBG, blood test, visits)
- Seeks Education and training
- Maintains Records
- Adherence to recommendations (diet, medications, lifestyle)
- Ideally-motivated and willing
Evaluation and Assessment of Psychosocial - Emotional Disorders in Patients with DM

- **Anxiety and associated disorders**
  - May be present initially and with identified complications; estimated at 20% of patients
  - Examples: Needle or glycemia or complications phobias; denials of seriousness; O-C behavior; PTSD

- **Depression**
  - Annual screening; Females > Males
  - Evaluation with PHQ-9; high scores referred
  - Behavioral therapist with CBT or interpersonal therapy experience
  - May require medications

Diabetes and Depression: Bidirectional Associations

- Study cohort of Approximately 5000 individuals, ages 45-84 yrs participating in the Multi-Ethnic Study of Atherosclerosis (MESA); initial screening 2000-2002; follow up 2004-2005
- Initial stratification by glucose tolerance (NGT; IGT; Diabetes) and depression using the CES-D questionnaire (severity defined by score >16)
- Assessed depression development within glucose tolerance categories; assessed diabetes in individuals with CES-D score < 16 and ≥ 16 or continuous depressive symptoms.

Diabetes and Depression: Bidirectional Associations

Table 2. Relative Hazards of Type 2 Diabetes for Each 5-Point Increase in CES-D Score by Baseline Depressive Symptoms Status in 5201 Men and Women

<table>
<thead>
<tr>
<th>Model</th>
<th>Per 5-Unit Increase in Continuous Depressive Symptoms (CES-D) Score</th>
<th>Elevated Depressive Symptoms Compared With Normal or Low Depressive Symptomsa</th>
</tr>
</thead>
<tbody>
<tr>
<td>7, Fully-adjusted(^h)</td>
<td>1.10 (1.02-1.20)</td>
<td>1.21 (0.87-1.67)</td>
</tr>
<tr>
<td>5, SES(^f)</td>
<td>1.11 (1.02-1.20)</td>
<td>1.39 (1.01-1.92)</td>
</tr>
<tr>
<td>6, Lifestyle(^g)</td>
<td>1.08 (0.99-1.19)</td>
<td>1.34 (0.94-1.88)</td>
</tr>
<tr>
<td>7, Fully-adjusted(^h)</td>
<td>1.10 (1.02-1.20)</td>
<td>1.21 (0.87-1.67)</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index, calculated as weight in kilograms divided by height in meters squared; CES-D, Center for Epidemiologic Studies Depression Scale; SES, socioeconomic status.
aElevated depressive symptoms were attributed to those whose CES-D score was 16 or higher, were taking antidepressant medication, or both.
bAdjusted for age, sex, race/ethnicity, and examination site.
cAdjusted using model 1 criteria and BMI.
dAdjusted using model 2 criteria and log-transformed triglycerides, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, systolic blood pressure, and log-transformed fasting insulin.
eAdjusted using model 2 criteria and for inflammatory markers IL-6 and C-reactive protein.
fAdjusted using model 2 criteria and SES factors: educational status (categorized as < high school, high school, and > high school), annual household income (categorized as <$15,000, $15,000-$24,000, $24,000-$34,000, $34,000-$49,000, $49,000-$74,000, and $74,000).
gAdjusted using model 2 criteria and daily caloric intake, smoking status, alcohol use, and physical activity.
hFully adjusted using criteria from all models.

Diabetes and Depression: Bidirectional Associations

Table 4. Relative Odds of Elevated Depressive Symptoms in 4847 Men and Women by Glucose Tolerance Category

<table>
<thead>
<tr>
<th>Model</th>
<th>Normal Fasting Glucose</th>
<th>Impaired Fasting Glucose</th>
<th>Untreated Diabetes</th>
<th>Treated Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6, Fully adjusted(^f)</td>
<td>1 [Reference]</td>
<td>0.80 (0.63-1.02)</td>
<td>0.73 (0.41-1.30)</td>
<td>1.52 (1.09-2.12)</td>
</tr>
<tr>
<td>4, Lifestyle(^a)</td>
<td>1 [Reference]</td>
<td>0.81 (0.63-1.05)</td>
<td>0.77 (0.44-1.37)</td>
<td>1.61 (1.10-2.34)</td>
</tr>
<tr>
<td>5, Diabetes severity(^b)</td>
<td>1 [Reference]</td>
<td>0.79 (0.62-0.99)</td>
<td>0.76 (0.45-1.30)</td>
<td>1.56 (1.13-2.15)</td>
</tr>
<tr>
<td>6, Fully adjusted(^f)</td>
<td>1 [Reference]</td>
<td>0.80 (0.63-1.02)</td>
<td>0.73 (0.41-1.30)</td>
<td>1.52 (1.09-2.12)</td>
</tr>
</tbody>
</table>

\(^a\) Adjusted for age, sex, race/ethnicity, examination site.
\(^b\) Adjusted for model 1 criteria and Body Mass Index (BMI).
\(^c\) Adjusted for model 1 criteria and socioeconomic status (SES). For definition of variables, see footnote “f” in Table 2.
\(^d\) Adjusted for model 2 criteria and lifestyle factors (see footnote “g” in Table 2 for a definition).
\(^e\) Adjusted for Model 2 criteria and markers of diabetes severity (dyslipidemia [triglycerides ≤200 mg/dL, high-density lipoprotein cholesterol <40 mg/dL, or both; for conversion factors to SI units see Table 1 footnotes], presence of hypertension [blood pressure ≥140/90 mm Hg, antihypertensive medication use, or both], and microalbuminuria [urinary albumin:creatinine ratio ≥30mg/g]).
\(^f\) Fully adjusted using criteria from all models.

Depression in Diabetic Patients
The relationship between mood and glycemic control

Diabetes, Depression, and Death: A Randomized controlled trial

- Investigated the effect of depression treatment on mortality among elderly patients with and without diabetes
- Study cohort of 584 individuals ages 60-94 yrs with depression (CES-D score >20); 72% women; 70% NHW; 123 with diabetes (21.3%) were identified in the Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) that included 20 primary care practices Philadelphia, NYC, and Pittsburgh.
- Intervention by depression care manager (offered guideline to physicians and helped patients with medication adherence or provided interpersonal psychotherapy) or usual care; vital status assessed over 5 years

Diabetes, Depression, and Death: A Randomized controlled trial

Figure 1.
Survival curves for patients with diabetes (n = 53) and patients without diabetes (n = 220) in practices randomized to Usual Care and patients with diabetes (n = 70) and patients without diabetes (n = 241) patients randomized to practices in the Intervention Condition. Data gathered from the PROSPECT study.

Psychosocial Care for People with Diabetes: A Position Statement from the ADA

- Psychosocial care should be integrated with collaborative, patient-centered medical care and provided to all people with diabetes.
- Providers should consider an assessment of symptoms of diabetes distress, depression, anxiety, and disordered eating and of cognitive capacities using patient-appropriate standardized/validated tools.
- Addressing psychosocial problems upon identification is recommended.

## Psychosocial and Behavior Assessments Diabetes Care

<table>
<thead>
<tr>
<th>Phase of living with diabetes</th>
<th>Continuum of psychosocial issues and behavioral health disorders in people with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral health disorder prior to diabetes diagnosis</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Diabetes diagnosis</strong></td>
<td>Normal course of adjustment reactions, including distress, fear, grief, anger, initial changes in activities, conduct, or personality</td>
</tr>
<tr>
<td><strong>Learning diabetes self-management</strong></td>
<td>Issues of autonomy, independence, and empowerment. Initial challenges with self-management demonstrate improvement with further training and support</td>
</tr>
<tr>
<td><strong>Maintenance of self-management and coping skills</strong></td>
<td>Periods of waning self-management behaviors, responsive to booster educational or supportive interventions</td>
</tr>
<tr>
<td><strong>Life transitions impacting disease self-management</strong></td>
<td>Distress and/or changes in self-management during times of life transition***</td>
</tr>
<tr>
<td><strong>Disease progression and onset of complications</strong></td>
<td>Distress, coping difficulties with progression of diabetes/onset of diabetes complications impacting function, quality of life, sense of self, roles, interpersonal relationships</td>
</tr>
<tr>
<td><strong>Aging and its impact on disease and self-management</strong></td>
<td>Normal, age-related forgetfulness, slowed information processing and physical skills potentially impacting diabetes self-management and coping</td>
</tr>
</tbody>
</table>

### Providers for psychosocial and behavioral health intervention

- All health care team members (e.g., physicians, nurses, diabetes educators, dieticians) as well as behavioral providers
- Behavioral or mental health providers (e.g., psychologists, psychiatrists, clinical social workers, certified counselors or therapists)

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*Figure 1—Psychosocial care for PWD: life and disease course perspectives. *With depressed mood, anxiety, or emotion and conduct disturbance. **Personality traits, coping style, maladaptive health behaviors, or stress-related physiological response. ***Examples include changing schools, moving, job/occupational changes, marriage or divorce, or experiencing loss.*
Integrating Diabetes and Depression Treatment

- Investigated the effect of integrating depression treatment among elderly African American patients with diabetes.
- A pilot study of 58 individuals, ages 50-80 yrs randomly assigned to integrated care intervention (care manager; N=29) or usual care (PCP; N=29). Glycemic (A1c level) and depression (CES-D) and medication adherence outcomes at baseline and 12 weeks. Baseline A1c level 7.3% in both groups; CES-D 15.6 vs 19.7 UC, NS; medication adherence 34.5% vs 20.7% UC, NS.
- Results: At 12 weeks, the intervention group had greater adherence to OADs (62.1 % vs 24.1% UC); lower A1c level (6.7% vs 7.9% UC); and lower depressive symptoms (CES-D score 9.6 vs 16.6 UC).
- Conclusion is that integrated depression care into diabetes management improves outcomes.

Psychosocial and Behavior Assessments Diabetes Care

Table 1—Situations that warrant referral of a person with diabetes to a mental health provider for evaluation and treatment

- If self-care remains impaired in a person with diabetes distress after tailored diabetes education
- If a person has a positive screen on a validated screening tool for depressive symptoms
- In the presence of symptoms or suspicions of disordered eating behavior, an eating disorder, or disrupted patterns of eating
- If intentional omission of insulin or oral medication to cause weight loss is identified
- If a person has a positive screen for anxiety or FoH
- If a serious mental illness is suspected
- In youth and families with behavioral self-care difficulties, repeated hospitalizations for diabetic ketoacidosis, or significant distress
- If a person screens positive for cognitive impairment
- Declining or impaired ability to perform diabetes self-care behaviors
- Before undergoing bariatric surgery and after if assessment reveals an ongoing need for adjustment support

Psychosocial and Behavior Assessments Diabetes Care

Depression:
Center for Epidemiologic Studies-Depression (CES-D) scale: 20 item, self-report scale designed to measure current depressive symptomatology including depressed mood, feelings of guilt and worthlessness, helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. CES-D score > 16 is associated with severe depressive symptoms; used in population studies.

Patient Health Questionnaire-9 (PHQ-9): 9-item measure of depressive symptoms (corresponding to criteria for major depressive disorder). More clinically relevant and appropriate; score of 15-20=Mod Severe, >20=Severe.

Psychosocial and Behavior Assessments Diabetes Care

*Diabetes-related Distress:*  
Diabetes Distress Scale (DDS): 17 item questionnaire measuring diabetes-specific distress in 4 domains: emotional burden, diabetes interpersonal distress, physician-related distress, and regimen-related distress

*Anxiety:*  
Beck Anxiety Inventory (BAI): 21 items assessing self-reported anxiety

*Cognitive impairment:*  
Mini-Mental State Examination (MMSE): 11-item (30-point) screen for cognitive impairment in adults

Cognitive Behavioral Therapy versus sertraline in patients with depression and diabetes

Table 2—Differences between interventions from baseline to the end of the long-term phase in diabetes patients who initially responded to short-term depression treatment (ITT analysis)

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Unadjusted estimated</th>
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<tbody>
<tr>
<td></td>
<td>CBT group n = 53</td>
</tr>
<tr>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>HbA₁c, % (mmol/mol)</td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>9.37 ± 1.63 (79)</td>
</tr>
<tr>
<td>3 months</td>
<td>9.12 ± 1.61 (76)</td>
</tr>
<tr>
<td>15 months</td>
<td>9.22 ± 1.67 (77)</td>
</tr>
<tr>
<td>HbA₁c decrease of ≥1% after</td>
<td></td>
</tr>
<tr>
<td>15 months vs. baseline</td>
<td>5 (9.4)</td>
</tr>
<tr>
<td>HAMD-17</td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>18.04 ± 4.62</td>
</tr>
<tr>
<td>3 months</td>
<td>5.40 ± 3.03</td>
</tr>
<tr>
<td>15 months</td>
<td>7.83 ± 6.49</td>
</tr>
<tr>
<td>Remission of depression, %</td>
<td></td>
</tr>
<tr>
<td>15 months</td>
<td>27 (50.9)</td>
</tr>
</tbody>
</table>

Treatment of Depression and Diabetes with CBT and Exercise

- Program ACTIVE II; investigation of glycemic control and major depressive disorder (MDD) outcomes in patients with type 2 diabetes and depression.
- Interventions: Cognitive Behavior Therapy (CBT, 10 individual sessions), Exercise (EXER, 12-weeks), CBT+EXER and Usual Care (UC); offered via community-engaged research (CEnR) approach. *Dining with Diabetes* nutrition program for all.
- RCT examining changes at 6 and 12 months from baseline. N=140 T2DM adults with MDD > 2 weeks, medication treatment stable for 6 weeks, aged M=56 years (SD=10.7), 77% female, 71% white, 52% married and 34% completed high school or trade school were enrolled.

Treatment of Depression and Diabetes with CBT and Exercise

- At post-intervention, CBT, EXER, or CBT+EXER groups reported fewer depressive symptoms (all p<.05), reduction in negative automatic thoughts (all p<.03), improved physical quality of life (QoL; all except CBT only p<.03), and decreased diabetes distress (p<.01) compared to UC. EXER and CBT+EXER reported improved diabetes-specific QoL (p<.01) compared to UC.
- In those with a baseline A1c ≥ 7.0%, EXER resulted in a clinically meaningful 0.7% improvement in HbA1c (p<.04) compared to those receiving CBT or UC.
- These interventions enable behavioral health and exercise professionals to extend the availability of depression treatment options for T2DM patients in ways that are complementary to medical care.
It is reasonable to include psychological and social assessments of patient as part of diabetes management.

Psychosocial screening and follow-up may include:
- Attitudes about diabetes
- Expectations for medical management and outcomes
- Mood
- Quality of life
- Financial, social, emotional resources
- Psychiatric history

Screen on a routine basis for depression and diabetes-related distress, anxiety, eating disorders, and cognitive impairment.

Thank you for your attention.

Any Questions?