Arizona Center for Rural Health
State Office of Rural Health Webinar Series

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AzCRH www.crh.arizona.edu
Carlie Felion, MSN, APRN, FNP-BC, PMHNP-BC, BC-ADM and Vanessa Da Silva, PhD, RD

The Impact of Diabetes Prevention Program Participation Among Individuals and Their Family Members: A Mixed-Methods Study
The Impact of Diabetes Prevention Program Participation Among Individuals and Their Family Members: A Mixed-Methods Study

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School of Nutritional Sciences and Wellness

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College of Nursing
Background
Diagnosed Diabetes in Arizona 2004-2019

The maps illustrate the prevalence of diagnosed diabetes in Arizona from 2004 to 2019, with color coding representing different percentage ranges of diabetes diagnoses. The varying shades indicate the percentage of the population diagnosed with diabetes, with darker colors denoting higher percentages. The data is presented by year, with 2004, 2011, and 2019 maps showing regional trends in diabetes diagnosis across the state.
Diabetes By Race/Ethnicity

Rates of diagnosed diabetes in U.S. adults aged 18 years or older by race/ethnicity, 2018–2019
Diabetes Mortality by Urbanization Status

Trends in age-adjusted diabetes-related mortality in the USA 1999–2019, stratified by urbanization status, per 100,000 population.

Diabetes as the underlying cause of death

Diabetes as a contributing cause of death

The images show two graphs. The left graph (a) illustrates the trend of diabetes as the underlying cause of death, with separate lines for urban and rural populations. The right graph (b) shows similar data for diabetes as a contributing cause of death.
Prediabetes Increases Risk of:

- Type 2 Diabetes
- Cardiovascular disease
- Stroke

1 out of 3 adults are estimated to have prediabetes

96 MILLION ADULTS
What is Prediabetes?

Higher than average blood sugars

- Aka “borderline diabetes” or “impaired glucose tolerance”
- Not high enough to be diagnosed as diabetes
- No symptoms
- May lead to type 2 diabetes
- Lifestyle changes help reduce risk of developing T2D
## Clinical Diagnosis

<table>
<thead>
<tr>
<th></th>
<th>Fasting Blood Glucose</th>
<th>Hemoglobin A1c</th>
<th>Random Blood Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal Blood Sugar</strong></td>
<td>60 – 100 mg/dL</td>
<td>Below 5.7%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Prediabetes</strong></td>
<td>100– 125 mg/dL</td>
<td>5.7 – 6.4%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td>126 mg/dL and up</td>
<td>6.5% or above</td>
<td>Over 200 mg/dL</td>
</tr>
</tbody>
</table>
Who should get screened for prediabetes & diabetes?

EVERYONE 35 years and older!*

*earlier, if you have multiple risk factors
Quick screening

1. How old are you?
   - Younger than 40 years (0 points)
   - 50–59 years (2 points)
   - 60 years or older (3 points)

2. Are you a man or a woman?
   - Man (1 point)
   - Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?
   - Yes (1 point)
   - No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?
   - Yes (1 point)
   - No (0 points)

5. Have you ever been diagnosed with high blood pressure?
   - Yes (1 point)
   - No (0 points)

6. Are you physically active?
   - Yes (0 points)
   - No (1 point)

7. What is your weight category?
   (See chart at right)

**If you scored 5 or higher**

Total score:

- You are at increased risk for having prediabetes and are at high risk for type 2 diabetes. Talk to your doctor to see if additional testing is needed.

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'10&quot;</td>
<td>119-142</td>
</tr>
<tr>
<td>4'11&quot;</td>
<td>124-147</td>
</tr>
<tr>
<td>5'0&quot;</td>
<td>128-152</td>
</tr>
<tr>
<td>5'1&quot;</td>
<td>132-157</td>
</tr>
<tr>
<td>5'2&quot;</td>
<td>136-163</td>
</tr>
<tr>
<td>5'3&quot;</td>
<td>141-168</td>
</tr>
<tr>
<td>5'4&quot;</td>
<td>145-173</td>
</tr>
<tr>
<td>5'5&quot;</td>
<td>150-179</td>
</tr>
<tr>
<td>5'6&quot;</td>
<td>155-185</td>
</tr>
<tr>
<td>5'7&quot;</td>
<td>159-190</td>
</tr>
<tr>
<td>5'8&quot;</td>
<td>164-196</td>
</tr>
<tr>
<td>5'9&quot;</td>
<td>169-202</td>
</tr>
<tr>
<td>5'10&quot;</td>
<td>174-208</td>
</tr>
<tr>
<td>5'11&quot;</td>
<td>179-214</td>
</tr>
<tr>
<td>6'0&quot;</td>
<td>184-220</td>
</tr>
<tr>
<td>6'1&quot;</td>
<td>189-226</td>
</tr>
<tr>
<td>6'2&quot;</td>
<td>194-232</td>
</tr>
<tr>
<td>6'3&quot;</td>
<td>200-239</td>
</tr>
<tr>
<td>6'4&quot;</td>
<td>205-245</td>
</tr>
</tbody>
</table>

**1 Point  2 Points  3 Points**

You weigh less than the 1 Point column (0 points)
What Helps People Prevent Diabetes?

Early diagnosis of prediabetes is KEY

- Healthy eating
- Physical activity
- Weight loss (if done in a healthful way)
- Medication (depending on your other risk factors -- talk to your doctor)

The National Diabetes Prevention Program addresses the top three!
Study population: adults >25y, clinical prediabetes, BMI >24
Cumulative Incidence of Diabetes According to Study Group

Diabetes Prevention Program Research Group.

*N Engl J Med* 2002
National Diabetes Prevention Program (DPP)
Lifestyle Change Program

**CDC-Approved Curriculum**
Evidence and practice-based material focused on healthy lifestyle choices

**Lifestyle Coach**
Trained individual that serves as group facilitator over the course of the year

**Group Support**
Emphasis on group support and group problem-solving over the course of the year.

**Medicare Reimbursement**
Medicare, Medicaid (certain states), and some private insurance plans.
University of Arizona Cooperative Extension
Diabetes Prevention Program

Target audience: people with prediabetes or at high risk for diabetes

- Statewide
  - In person (selected counties, see map)
  - Remotely over Zoom
- Classes in English or Spanish
- 12 month program, 26 sessions

FREE of charge for eligible participants!
Who Can Participate in the Diabetes Prevention Program?

- ≥18 years old
- Body mass index ≥25, (≥23 if Asian)
- No previous diagnosis of type 1 or type 2 diabetes

**High risk of diabetes as determined by:**
- A blood test result within the past year of:
  - ✔ Hemoglobin A1C: 5.7%–6.4%; OR
  - ✔ Fasting plasma glucose: 100–125 mg/dL; OR
  - ✔ Two-hour plasma glucose (after a 75 gm glucose load): 140–199 mg/dL
  - OR: A history of *gestational diabetes*

- OR: A high score on a risk test
<table>
<thead>
<tr>
<th>Class Title</th>
<th>Date &amp; Time</th>
<th>Class Title</th>
<th>Date &amp; Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the program</td>
<td>12/14/21 6:00 PM</td>
<td>Get Back on Track</td>
<td>4/26/22 6:00 PM</td>
</tr>
<tr>
<td>Get active to prevent T2</td>
<td>12/21/21 6:00 PM</td>
<td>Get Support</td>
<td>5/10/22 6:00 PM</td>
</tr>
<tr>
<td>Track your activity</td>
<td>12/28/21 6:00 PM</td>
<td>Stay Motivated to Prevent T2</td>
<td>5/24/22 6:00 PM</td>
</tr>
<tr>
<td>Eat well to prevent T2</td>
<td>1/4/21 6:00 PM</td>
<td>When Weight Loss Stalls</td>
<td>6/7/22 6:00 PM</td>
</tr>
<tr>
<td>Track your food</td>
<td>1/11/22 6:00 PM</td>
<td>Take a Movement Break</td>
<td>6/21/22 6:00 PM</td>
</tr>
<tr>
<td>Get more active</td>
<td>1/18/22 6:00 PM</td>
<td>Keep Your Heart Healthy</td>
<td>7/5/21 6:00 PM</td>
</tr>
<tr>
<td>Energy In, Energy Out</td>
<td>1/25/22 6:00 PM</td>
<td>Shop and Cook to Prevent Type 2</td>
<td>7/19/22 6:00 PM</td>
</tr>
<tr>
<td>Eating to Support Your Health Goals</td>
<td>2/1/22 6:00 PM</td>
<td>Find Time for Physical Activity</td>
<td>8/2/22 6:00 PM</td>
</tr>
<tr>
<td>Manage Stress</td>
<td>2/15/22 6:00 PM</td>
<td>Get Enough Sleep</td>
<td>8/16/22 6:00 PM</td>
</tr>
<tr>
<td>Eat Well Away from Home</td>
<td>3/1/22 6:00 PM</td>
<td>Stay Active Away from Home</td>
<td>8/30/22 6:00 PM</td>
</tr>
<tr>
<td>Manage Triggers</td>
<td>3/15/22 6:00 PM</td>
<td>More About Type 2</td>
<td>9/27/22 6:00 PM</td>
</tr>
<tr>
<td>Stay Active to Prevent Type 2</td>
<td>3/29/22 6:00 PM</td>
<td>More About Carbs</td>
<td>10/25/22 6:00 PM</td>
</tr>
<tr>
<td>Take Charge of Your Thoughts</td>
<td>4/12/22 6:00 PM</td>
<td>Prevent T2 for life</td>
<td>11/22/22 6:00 PM</td>
</tr>
</tbody>
</table>
Goals for Participants

Participants will aim to:

• Lose at least 5% of starting weight
• Get at least 150 minutes of moderate physical activity each week
• Lower HbA1c by 0.2%

They will do so by:

• Tracking their food intake and physical activity
• Making small, achievable changes over time
• Getting support from other participants and from their lifestyle coach
Participant Success

• Lost 19 lbs (and another 10 lb since the program ended!)

• No longer needed knee surgery

• Whole family became healthier!
What is the impact of the DPP lifestyle change program beyond the primary outcome?

“This program was the best thing that I've done in a long time…And I no longer have to take the prediabetes medication my doctor had prescribed.”

“My joint pain and inflammation are virtually gone.”

“My cholesterol is lower!”
“Just wanted to share this with you. Maybe it could help someone else along the way. Change is possible!

The first liver scan is at my highest weight, 225 lbs and my weight on the second scan, is most likely around 170 lbs. It’s gone from really high fatty levels to almost normal.”
The Study
Small mixed-methods cross-sectional descriptive study funded by a $2000 grant from the Cooperative Extension
Research Questions

1) Explore whether participation in the Diabetes Prevention Program has health benefits beyond the primary outcome of weight loss for the individual.

1) Does an individual’s participation in the Diabetes Prevention Program impact health behaviors or outcomes for non-participating household members?
Methods

Setting: State of Arizona

Sample: N=56 adults with prediabetes who completed the year-long DPP

Inclusion Criteria: Adults 18+, English speakers

Exclusion Criteria: non-English speaking

Intervention: 1 year-long CDC-approved DPP curriculum delivered in-person or online

Measure: 24-item Qualtrics survey sent to DPP completers via email, 6 semi-structured interviews conducted via Zoom

Primary Outcome: Weight Loss
Data Analysis:

• Quantitative data analyzed using descriptive statistics (Excel)

• Qualitative data was inductively and deductively analyzed using NVIVO software

• Qualitative findings reviewed and agreed upon by 2 researchers
## Sample Characteristics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total (n)</strong></td>
<td>56</td>
</tr>
<tr>
<td><strong>female</strong></td>
<td>49</td>
</tr>
<tr>
<td><strong>male</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>Age, y, mean (range)</strong></td>
<td>61.7 (33 - 79)</td>
</tr>
<tr>
<td><strong>Ethnicity (%)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Hispanic</strong></td>
<td>15%</td>
</tr>
<tr>
<td><strong>Non-Hispanic</strong></td>
<td>83%</td>
</tr>
<tr>
<td><strong>NR</strong></td>
<td>2%</td>
</tr>
<tr>
<td><strong>Race (%)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>78%</td>
</tr>
<tr>
<td><strong>Asian</strong></td>
<td>9%</td>
</tr>
<tr>
<td><strong>American Indian/Pacific Islander</strong></td>
<td>6%</td>
</tr>
<tr>
<td><strong>African American</strong></td>
<td>6%</td>
</tr>
<tr>
<td><strong>NR</strong></td>
<td>2%</td>
</tr>
</tbody>
</table>
Household Members

14 lived alone

25 lived with spouse/partner

1 lived with spouse/partner and another person

8 lived with spouse/partner and their adult children

3 lived with spouse/partner and their minor children

3 lived with their adult children

2 lived with another person (roommate, etc)
Results
### Perceived Support from Household Members

<table>
<thead>
<tr>
<th>Category</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse/partner</td>
<td>34 (60.7%)</td>
</tr>
<tr>
<td>Adult child(ren)</td>
<td>10 (17.8%)</td>
</tr>
<tr>
<td>Minor child(ren)</td>
<td>2 (3.5%)</td>
</tr>
</tbody>
</table>
Benefits to Household Members

55.3%

HHMs made healthy changes!

- 64.8% spouses/partners
- 36.3% adult children
- 100% minor children
Weight Loss

4 participants did not lose weight

18 lost 1-5 pounds

16 lost 6-10 pounds

18 lost over 10 pounds

16 non-participating HHMs also lost weight
Family Support and Weight Loss Success

- 0 lbs - 50% felt HHMs were supportive
- 1-5 lbs - 66.6% felt supported
- 6-10 lbs - 81.2% felt supported
- > 10 lbs - 61% felt supported
Less Sedentary Behavior

87.5% Participants

38% Household Members
Ate More Fruit & Vegetables

85.7% Participants

47.6% HHMs
Ate Smaller Portions

Participants: 75%

Household members: 40.5%
Read Food Labels

Participants

80.4%

Household Members

28.6%

Food Label
Prioritized Sleep

Participants: 57.1%

Household Members: 26.2%
More Intentional Physical Activity

Participants: 83.9%

Household Members: 35.7 %
Drank Less Alcohol

Participant: 17.9%

Household Member: 4.8%
<table>
<thead>
<tr>
<th>Health Behavior</th>
<th>Participant</th>
<th>Household Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed Shopping Habits</td>
<td>60.7 %</td>
<td>19 %</td>
</tr>
<tr>
<td>Changed Cooking Style</td>
<td>55.3 %</td>
<td>26.2 %</td>
</tr>
<tr>
<td>Chose Lower Calorie Foods</td>
<td>75 %</td>
<td>28.6 %</td>
</tr>
</tbody>
</table>
### Health Behavior Changes

<table>
<thead>
<tr>
<th>Health Behavior</th>
<th>Participant</th>
<th>Household Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Medication Adherence</td>
<td>26.8%</td>
<td>16.6%</td>
</tr>
<tr>
<td>Better Adherence to CPAP/Devices</td>
<td>17.9%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Made/Kept Medical Appointments</td>
<td>44.6%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Got Help for Medical/Mental Health</td>
<td>26.8%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Health Improvement</td>
<td>Participant</td>
<td>Household Member</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Lower Blood Pressure</td>
<td>33.9%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Lower Cholesterol</td>
<td>28.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Lower Blood Sugar</td>
<td>60.7%</td>
<td>26.2%</td>
</tr>
<tr>
<td>Decreased Joint Pain</td>
<td>30.4%</td>
<td>2.4%</td>
</tr>
<tr>
<td>More Energy</td>
<td>57.1%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Took Less Medications</td>
<td>8.9%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Better Sleep</td>
<td>41.1%</td>
<td>14.3%</td>
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### PsychoSocial Health Improvements

<table>
<thead>
<tr>
<th></th>
<th>Participant</th>
<th>Household Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Mood</td>
<td>53.6%</td>
<td>19%</td>
</tr>
<tr>
<td>Decreased Stress</td>
<td>35.7%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Increased Self-Confidence</td>
<td>48.2%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Stronger Social Support</td>
<td>25%</td>
<td>4.7%</td>
</tr>
</tbody>
</table>
Other Improvements

Enjoying more healthy, plant-based foods

Less dry skin

Decreased neuropathy symptoms

Made new friends

Allowed participants to prioritize self-care
Qualitative Concepts/Themes

- Motivation to Participation
- Program Strengths/Benefits
- Changes in Cognitions/Health Behaviors
- Relationships with Program Educators
- Helpful Content
- Camaraderie and Peer Support
- Outcomes/Results/NSVs
Motivation to Participate

Improve Health

Reduce joint pain related to excess weight

Enable a safer surgical procedure (knee joint replacement)

Excess weight interfered with ability to participate fully in desired activities (ex. kneeling to pray at church)

Family member was going to get participant a wheelchair and hire a helper so she could visit a theme park

Intrigued by the programs ability to reduce diabetes and help with weight loss. Husband was intrigued. 10% does not seem like that much, but was surprised to learn it could make a big impact
Program Strengths/Benefits

- Close to home/ Location Convenient/ Convenient Time
- Online class was appreciated- younger adults, with little kids, etc, not living nearby, long commutes, etc
- Small group of peers with similar health issues- were welcoming, casual, “felt like talking to group of friends”, and they “helped each other out”
- Opportunity for socialization, decreased loneliness
- Resources were perceived as helpful (especially food/activity logs)
- Materials/lessons easy to understand
- Lots of ‘reality checks’ regarding portion sizes, food types, effects of grazing
Other Cognitive/Behavior Changes

- Being patient and trusting the process
- Follow the plan
- Make better choices
- Eat, then wait 20 minutes. If still hungry, then go back for a little more
- Not succumbing to sabotage
- Made healthy modifications to favorite foods (adding veggies to lo mein, etc.)
Other Reported Behavior Changes

- Using a standing desk, doing squats during the day, walking dog, walking at work
- Used little tricks to eat better- eating a few fries, then the burger, and by the time they came back to the fries they were cold and unappetizing
- Meal Planning- if leftovers are planned for lunch, family members likely to go back for seconds
- Packing a lunch (avoiding temptations from fast food, convenience stores)
Relationships with Leaders

• Kind, compassionate, charismatic, and non-judgmental program leaders
• Held them accountable
• Encouraged realistic expectations ("not thinking you will lose 11 pounds in one a week")
• Provided encouragement, reminded them of what worked for them in the past
• Were invested in their success but did not force anything on them
• Helped them personalize their program
• Did not promise that once weight loss occurred, "everything would be good"
Helpful Content

- Opened eyes to new possibilities/ways of living and eating
- Eat fiber first, cut portions, level up, healthy alternatives
- How to shop for and cook healthy meals
- How to make exercise happen
- How to avoid slippery slopes
- Enjoyed the flyers- learned something new from each
- How to incorporate what they learned into real-life
- Anticipate and plan for busy days, traveling, etc.
- Striving for progress, not perfection
Peer Support

- Helped to see others had similar issues and struggles
- Could learn from each other, take notes
- Eye opening to see others who had disabilities doing what they could even though it was hard for them to exercise
- Being the youngest in the program and seeing how older people were working on their health motivated and inspired them
Outcomes/Non-Scale Victories

• Better equipped to deal with life stressors
• Better caregivers and role models for family
• Increased self-acceptance, self-esteem, self-efficacy, self-compassion, and empowerment
• Less perceived social stigma
• Less frequent office visits, avoided surgery (less healthcare costs)
Outcomes/Non-Scale Victories

- Spent less on food
- Less environmental impact (less meat)
- Had a healthy pregnancy, less edema, less weight gain
- Felt joy about fitting into clothes they hadn’t worn in years
- Family members and friends who were concerned for her health were now excited for her
- Easier to get up and play with kids, enjoy doing fun things
Memorable Quotes

“The program taught me the skills needed to be active, choose food wisely, and focus on my health”

“The program was very educational. I appreciated the support of class members, and it prompted me to research nutritional ways to lower blood sugars and achieve weight loss”

“The program has made a big difference in my life!”

“There is no one else in my household, but I have taught other family members about what I learned in the program. It was very informative and taught me lifelong lessons.”
“When I joined the program, I was concerned that it would be more of the same. People always assume that fat girls don’t know about dieting, but actually, we know more than anyone because we have been dieting off and on our whole lives.

Something I appreciated about the program is that it wasn’t just teaching things I already knew. It was also about learning how to make small, gradual, positive changes, and learning to forgive yourself when you get off track.”
Key Points

• Positive feedback and praise from HCP was perceived as rewarding

• People trust their family members and friends, and perceive them as a reliable source of health information and behavioral models

• Individual participation in the DPP can have a positive impact on the health and health behaviors of both participants and non-participating household members
Questions?
Our Contact Info

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