The Role Of APRNs In Prediabetes Screening

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Objectives

• Discuss evidence surrounding screening for pre-diabetes
• Discuss evidence surrounding Hba1C as a screening tool
• Describe role of screening in worksite setting
• Translate evidence obtained from an electronic survey describing screening practices in NWA

Background

• Diabetes is a burdensome chronic disease
• There is evidence for the benefits of pre-diabetes screening
• Support for guidelines including the use of HbA1c for pre-diabetes screening
• Some evidence that healthcare providers are screening patients for pre-diabetes using HbA1c

Taking the challenge: Are you at Risk?

• Are you 45 years of age or older?
• Is your BMI ≥25 kg/m2?
• Are you Asian American with BMI ≥25 kg/m2 or ≥ 23 kg/m2 *** Population Health?
• Do you have high blood pressure?
• Is there a family hx of diabetes?
• Are you sedentary for > 90 minutes/day?
• Have you ever had gestational diabetes or a baby weighing more than 9 lbs?

Acknowledgements

Special Thanks

Texas State Nurse Practitioner Association

Special Thanks

Participants

Much Appreciated

Faculty & Staff Members TCU/EMSON
Prediabetes Test


**Purpose**

The purpose of this project was to survey APRNs to assess current screening practices for pre-diabetes.

**Introduction**

**Healthy State**
- BP < 140/90
- BMI < 30
- HbA1C < 5.7%
- FBS 60-100 mg/dl
- OGTT < 140 mg/dl

**Pre-diabetes**
- A precursor of T2D is prediabetes characterized by insulin resistance, impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) (Cowie et al., 2009).

**Diabetes**
- Chronic progressive disease as a failure of pancreatic beta cells
- Most common form secondary to body decreased production enough insulin or cells ignore the insulin produced (ADA, 2013).

**Causes of Pre-diabetes**

- Development of insulin resistance
- Excess fatty acids in diet
- Leads to increase of triglycerides in adipose tissues

**Significance**

- 79 million people with pre-diabetes
- Pre-diabetes lead to diabetes within 5-7 years
- Retinopathy
- Nephropathy
- Neuropathy
- Microvascular changes
- Mortality

CDC, 2011
Significance

U.S. Pre-diabetes cases, (CDC, 2011)

U.S. diabetes cases, (CDC, 2011)

Incidence in Arkansas

% of Occurrence

Incidence in Arkansas

248

Thousand People Diagnosed
With Diabetes in Arkansas, (Biddle 2008)

Costs

• 2012 $245 billion, $274 in direct medical costs

• $69 billion in reduced productivity


Costs/Expenditures

• 2007, estimated costs of diabetes were $174 billion; inclusive of $116 billion in medical expenditures

• Indirect costs include absenteeism of approximately ($2.6 billion), reduced productivity $0.8 billion

Cost Geographically

• California highest incidence diabetes with estimated costs $27.6 billion

• Florida trailed with an estimated cost of $18.9 billion
Economic Impact: What’s The Link?

- Patients
- Families
- Society
- Healthcare
- Access

Obesity

- Klein Woolthius et al. (2009)
- Obesity alone best predictor
- Arkansas 1 of 12 states with an obesity rate greater than 30% and is ranked 7th overall (CDC 2012, Trust for America’s health and the Robert Wood Johnson Foundation)

Obesity in the Workplace

- Economic impact
  - Estimated cost to employers $147 billion/year
  - Medical expenses related to obesity = 42% higher

Study Results

- Study conducted in Germany evaluated previous screening data of over 22,000 employees
- Result 15% had diabetes or undiagnosed pre-diabetes (Oberlinner, 2007)

Prevention

- Landmark study by Lindström et al., (2003) emphasizes lifestyle changes
  - Weight loss
  - Physical activity

Why Screen?

- Cost
  - Screening inexpensive
  - Feasible in identifying undiagnosed
  - Screening cost-effective
  - Linked to appropriate interventions

- Prevention
  - Implementation of evidence-based guidelines in disease prevention and health promotion

- Process
**Why Screen?**

- **Lag Time**
  - Saudak et al. (2008) 7yrs
  - Bertram & Vos (2010) 8.5yrs
  - Improves quality of life

- **Screening Tests**
  - Oral glucose tolerance test (OGTT)
  - Fasting plasma glucose (FBG)

- **New Screening Test**
  - Hemoglobin A1C (HbA1C)
  - Glycosylated hemoglobin
  - Measures life cycle of red blood cells over 60-90 days

**Timeline of HbA1C Clinical Practice**

- **Introduction of HbA1C**
  - 1999
- **Adopted Use of HbA1C**
  - 2009
  - 2012
  - Recommended Use

**Why Screen?**

- **HbA1C Benefits Versus Pitfalls of Use**
  - **Benefits**
    - Cost
    - Genetic variations
    - No fasting
  - **Pitfalls**
    - Cost
    - Genetic variations
    - Ethnic groups

**Level Of Evidence**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>Systematic review &amp; meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analysis</td>
</tr>
<tr>
<td>Level II</td>
<td>One or more randomized controlled trials</td>
</tr>
<tr>
<td>Level III</td>
<td>Controlled trial (no randomization)</td>
</tr>
<tr>
<td>Level IV</td>
<td>Case-control or cohort study</td>
</tr>
<tr>
<td>Level V</td>
<td>Systematic review of descriptive &amp; qualitative studies</td>
</tr>
<tr>
<td>Level VI</td>
<td>Single descriptive or qualitative study</td>
</tr>
<tr>
<td>Level VII</td>
<td>Expert opinion</td>
</tr>
</tbody>
</table>

**Note.** Adapted from Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice, by B. M. Melnyk and E. Fineout-Overholt, E., 2011, Philadelphia: Lippincott, Williams, & Wilkins.

**Literature Review**

- **Primary Intervention**
  - **Survey APRNs**
    - Voluntary Participation
  - **15 item electronic survey**
  - **14 multiple choice items & one open-ended item**
  - **Launched using Qualtrics**

- **Patterns of evidence over time**
  - Studies from US and internationally in English based on relevancy of project

**Primary Intervention**

- **Survey APRNs**
  - Voluntary Participation
  - **15 item electronic survey**
  - **14 multiple choice items & one open-ended item**
  - **Launched using Qualtrics**
Primary Intervention

- Four items APRN background/work environment
- Five of the items pertained to screening process/frequency of screening
- Remaining six pertained to patient education and support for disease prevention and/or management

Methodology

- 15 item electronic questionnaire (2) open ended questions
- Distributed using Qualtrics to APRNs
- Volunteer participation

Primary Intervention

Survey Respondents

NP 54%
CNS 1%
Midwife 1%

Item 2. Where is your clinical practice setting

<table>
<thead>
<tr>
<th>Practice Setting</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>7</td>
</tr>
<tr>
<td>Clinic-based</td>
<td>30</td>
</tr>
<tr>
<td>Community based</td>
<td>4</td>
</tr>
<tr>
<td>Primary Practice</td>
<td>2</td>
</tr>
<tr>
<td>Health</td>
<td>7</td>
</tr>
<tr>
<td>Occupational</td>
<td>1</td>
</tr>
<tr>
<td>Corporate</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

Item 3. What Is Your Area of Specialty?

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school (3-5)</td>
<td>1</td>
</tr>
<tr>
<td>School age (5-11)</td>
<td>0</td>
</tr>
<tr>
<td>Adolescent</td>
<td>30</td>
</tr>
<tr>
<td>Adult (&gt;18)</td>
<td>22</td>
</tr>
<tr>
<td>Chronic illness</td>
<td>0</td>
</tr>
</tbody>
</table>

Item 7. What Is Your Patient Mix?

<table>
<thead>
<tr>
<th>Patient Mix</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care</td>
<td>5</td>
</tr>
<tr>
<td>Family practice</td>
<td>30</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>4</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>2</td>
</tr>
<tr>
<td>Maternal Child</td>
<td>0</td>
</tr>
<tr>
<td>Surgery</td>
<td>7</td>
</tr>
<tr>
<td>Specialty clinic</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>
Item 4. Is Routine Screening Done For Pre-diabetes?

Routine Screening

- Yes: 71%
- No: 29%

Solutions

When Routine Screening Occurs

What Diagnostic Tools Are Used?

Solutions: Diagnostic Tests

- FBS 19 (51%)
- HbA1c 13 (35%)
- OGGT 0
- Other 5 (14%)

Item 4. What Factors Would Prevent Screening?

TABLE 4: Factors For Preventing

Secondary Intervention Support Tool

- Initial pre-diabetes screening
- 2009 ADA (2012) guidelines for asymptomatic screening in adults
- Sheehy et al. (2010) found that when compared to ADA guidelines, US Preventive Task Force criteria for screening in ambulatory population identified fewer cases of pre-diabetes

Screening Undiagnosed Patients

Screening can be a feasible means for identifying undiagnosed patients with pre-diabetes

- Bertram & Vos; 2010
- Klein Woolthius et al., 2009
- Pajunen et al., 2010
- Saudek et al., 2008
Clinical practice guidelines help clinicians and patients during healthcare decision-making based on evidence from the literature and survey results. A determination was made to promote prediabetes screening among APRNs and development of screening tool.

Established Screening Guidelines

- Saudek et al., 2008 indicate the need for screening guidelines
- Institute of Medicine as cited in National Heart, Lung, and Blood Institute, n.d.

Screening Tools (Considerations)

- High Glucose
- Self-Report
- Race
- Physical Activity
- Age
- Blood Pressure
- BMI
- HbA1C Test

Screening Further Divided

- Chart review (BMI, age, and blood pressure)
- Screening additional health questionnaires (sex, level of physical activity, self-report and family history of related medical conditions, or another glucose or HbA1C test)
- Routine visits, health maintenance, follow-up visits, acute visits
- Toolbox screening questionnaire
- Laboratory screening
- Results

Intervention

Health coaching, fitness, and nutritional needs through agencies as:

- YMCA Community Partnerships
- Local, State, & Federal Programs

Effects Of Practice Change

- Economics
- Improved Health Promotion & Disease Prevention
- Advance & Maximize Role of APRNs as Screeners

Kaiser Family Foundation Report

- Kaiser report, if you have 1,000 employees, 100 have diabetes
- 27 of them are undiagnosed
- 250 of them have pre-diabetes
Kaiser Report cont.

- $2.7 million is the average annual insurance cost for employees with diabetes and prediabetes
- $912,438 is the annual increased cost in the event 50% of employees with prediabetes develop diabetes

Role as Screeners

- Advocate for screening in worksite clinics
- Devise proposals for in-house laboratory services
- Provide opportunistic screening
- Utilize ADA 2015 guidelines for recommended screening

Supporters of Screening

- American Diabetes Association (ADA)
- United States Preventive Services Task Force (USPSTF)
  - supports opportunistic screening only in patients with elevated bp
  - recommendation advocate for policy change

Stop Diabetes @ Work

- Stop Diabetes @ Work

Effects Of Practice Change

<table>
<thead>
<tr>
<th>Evaluations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Evaluation</td>
</tr>
<tr>
<td>Feedback from experts</td>
</tr>
<tr>
<td>Survey development</td>
</tr>
<tr>
<td>Question development/ clarity</td>
</tr>
<tr>
<td>Limited access for survey distribution</td>
</tr>
<tr>
<td>Outcome Evaluation</td>
</tr>
<tr>
<td>Information useful</td>
</tr>
<tr>
<td>HbA1c is used</td>
</tr>
<tr>
<td>Lack of generalizability to all APRNs in AR</td>
</tr>
<tr>
<td>Initial results indicated need to promote HbA1c</td>
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</table>

Lessons Learned

- Value of evidence based care and levels of evidence
- Length of time required to generate ideas and conceptualize societal changes
- Become an active participant in surveys to assist others
### Future Direction

- Additional studies for improved follow up testing and initiation of interventions
- Emphasis on dissemination of data to promote screening using recommended toolbox inclusive of guidelines
- Implementation of secondary intervention
- Additional studies to provide higher level of evidence to support screening
  - Explore specificity and sensitivity of hba1c regarding ethnic variations
  - More studies to examine validity and cost effectiveness of hba1c to compare to previous studies

### Role of APRNs

- APRN as educator regarding pathogenesis and link of obesity to pre-diabetes/diabetes
- Pathogenesis and its link to mitochondrial dysfunction/exploration of gene therapies
- APRN as collaborator/researcher/translator (engagement of pt’s in clinical trials i.e new D2d trial enrolled 2500 patients to explore link of low vitamin D to prediabetes)
- Grant writing/ PCORI

### References


### References (cont’d)


### Conclusion

- How is the role of APRNs best leveraged in worksite clinical setting?
- What is the link for bridging the gap in opportunistic screening?
- What is the return on investment (ROI) for employers/employees?
- What is the link to reaching high-risk populations?

### References


### References (cont’d)

References (cont’d)


References (cont’d)

