Health Literacy and Perceived Control in Patients with Diabetes

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Funding and Disclosures

• This study used data from the baseline analysis of a randomized controlled trial

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• I have no conflicts of interest to disclose
Control of Diabetes
Do clinicians and patients determine control differently?

• Clinicians: hemoglobin A1c (HbA1c) < 7.0%
  » Many patients poorly controlled by this measure (47%)
  » Patients often do not recall or understand the meaning of their HbA1c

• How do patients determine control?

Casagrande et al, Diabetes Care, 2013
Do et al, Amer J Ophthalmology, 2006
Harwell et al, Diabetes Educator, 2002
Health Literacy and Perceived Control

- Studies evaluating the effect of health literacy on HbA1c have been mixed.

- The effect of health literacy on accurate perceptions of control is unknown.

- To improve control we need to understand factors that impact patients’ perceptions of their own control.
  » Health literacy may be one such factor.
Study Objectives

- Identify factors associated with perceived good control in patients with persistently poorly controlled diabetes
  - Health Literacy
  - Self-efficacy
  - Depression
  - Self-care
## Factors of Interest

<table>
<thead>
<tr>
<th>Measure</th>
<th>Instrument</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Literacy</td>
<td>Rapid Estimate of Adult Literacy in Medicine (REALM)</td>
<td>0-66</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>Perceived Confidence in Diabetes Scale</td>
<td>0-7</td>
</tr>
<tr>
<td>Depression</td>
<td>Patient Health Questionnaire 2 (PHQ-2)</td>
<td>0-8</td>
</tr>
<tr>
<td>Self-Care</td>
<td>Summary of Diabetes Self-Care Activities Measure</td>
<td>0-70</td>
</tr>
</tbody>
</table>

Other measures evaluated were barriers to medication adherence, diabetes support received, confidence in taking diabetes medication, and diabetes distress.
Determining Perceived Control

• “How well do you think you are managing to control your diabetes?”
  » 5-point Likert scale from “Not very well” to “Very well”
  » Responses dichotomized into well/very well versus all others

• Analysis: bivariate and multivariable logistic regression

Recruitment and Data Collection

- Five University of Pennsylvania Health System primary care practices
- Persistent poor control
  - Last two HbA1c measurements in the electronic medical record >8.0%
- Survey and lab data were obtained during an in-person interview and baseline lab draw
Results

- 280 diabetic patients with persistently poor control
- 88% African American
- 70% women
- REALM
Many poorly controlled participants reported well/very well control.

- Perceived Control
  - Well/Very Well: 61%
  - Other: 39%
## Factors Associated with Perceived Control
### Bivariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Well/V. Well Perceived Control</th>
<th>Other Perceived Control</th>
<th>X² or t</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Literacy</td>
<td></td>
<td></td>
<td>22.90</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>HS and above</td>
<td>52 (29%)</td>
<td>128 (71%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th-8th grade</td>
<td>36 (57%)</td>
<td>27 (43%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 6th Grade</td>
<td>20 (61%)</td>
<td>13 (39%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td>3.15</td>
<td>0.08</td>
</tr>
<tr>
<td>&lt;4</td>
<td>67 (44%)</td>
<td>87 (56%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥4</td>
<td>41 (33%)</td>
<td>83 (67%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>5.39 (1.37)</td>
<td>4.37 (1.32)</td>
<td>30.58</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Self-Care</td>
<td>42.74 (12.30)</td>
<td>34.72 (12.77)</td>
<td>22.67</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>HbA1c</td>
<td>9.10 (1.55)</td>
<td>9.88 (1.84)</td>
<td>11.94</td>
<td>0.0006</td>
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</tbody>
</table>
Factors Associated with Perceived Control
Multivariable Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Literacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS and above</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th to 8th Grade</td>
<td>2.44</td>
<td>1.12, 5.32</td>
<td>0.025</td>
</tr>
<tr>
<td>≤6th Grade</td>
<td>4.51</td>
<td>1.48, 13.74</td>
<td>0.008</td>
</tr>
<tr>
<td>Depression</td>
<td>0.83</td>
<td>0.42, 1.66</td>
<td>0.598</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>1.45</td>
<td>1.12, 1.89</td>
<td>0.005</td>
</tr>
<tr>
<td>Self-Care</td>
<td>1.03</td>
<td>1.00, 1.06</td>
<td>0.026</td>
</tr>
<tr>
<td>HbA1c</td>
<td>0.81</td>
<td>0.66, 0.99</td>
<td>0.037</td>
</tr>
</tbody>
</table>

Model also adjusts for: age, sex, race, education, insurance type, comorbidities, HbA1c, barriers to medication adherence, diabetes support received, confidence in taking diabetes medication and diabetes distress
Predictors of Perceived Good Control

• Patients with low health literacy more likely to inaccurately perceive they were in good control

• Patients appear to use other cues, in addition to HbA1c, to determine control
  • Self-care
  • Self efficacy
Implications

• Health care providers should consider health literacy when discussing HbA1c and control of diabetes

• Self-care activities may be misinterpreted as a more important indicator of control than HbA1c

• Providers must ensure that patients who perform diabetes self-care activities understand that this alone does not guarantee adequate control of their disease
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