Health-Related Quality of Life and Utilities of Respondents with Type 2 Diabetes Compared with Those Differing Levels of Cardiometabolic Risk

Richard H. Chapman1, Kathleen M. Fox2, and Susan Grandy1

1ValueMedics Research, Falls Church, VA; 2Strategic Healthcare Solutions, LLC, Monton, MD; 3AstraZeneca Pharmaceuticals LP, Wilmington, DE

**BACKGROUND**

- Diabetes and its complications substantially affect patients’ HRQoL.
- Limited information available on HRQoL of individuals without diabetes but at high risk of developing this condition.
- Generic utility measures such as EQ-5D of relevant populations are necessary inputs for cost-effectiveness analyses that use quality-adjusted life years.
- There is a need to utilize generic HRQoL instruments among patients with diabetes to allow comparisons with populations without diabetes.
- Understanding the impact of diabetes on HRQoL may provide impetus for diabetes education and prevention.

**OBJECTIVES**

- Assess differences in HRQoL among respondents with type 2 diabetes (T2D) and those with varying levels of cardiometabolic risk, using data from the Study to Help Improve Early Evaluation and management of risk factors Leading to Diabetes (SHIELD).
- Provide HRQoL utility estimates for an US adult population at risk of developing diabetes, as well as US adults with T2D.

**METHODS**

**Study Design**

- Cross-sectional analysis of HRQoL and utility scores from the SHIELD study of adults with or at risk of T2D.
- SHIELD is a 5-year longitudinal population-based survey conducted to better understand the burden of illness of people living with diabetes and those at risk for its development.

**Study Population**

- Three groups of respondents studied:
  1. T2D: respondents with a reported diagnosis of type 2 diabetes mellitus
  2. High Risk: respondents with 3-6 cardiometabolic risk factors, which included:
     a. Abdominal obesity: waist circumference >97 cm in men, >89 cm in women
     b. BMI ≥28 kg/m²
     c. Reported diagnosis of cholesterol problems
     d. Reported diagnosis of high blood pressure
     e. History of cardiovascular disease
        i. Coronary heart disease
        ii. Myocardial infarction
        iii. Narrow or blocked arteries
        iv. Stroke
     v. Coronary artery bypass graft surgery, angioplasty, stents
  3. Low Risk: respondents with ≤2 of the above risk factors.

**HRQoL Assessment**

- HRQoL was measured at baseline by the EQ-5D, which provides a simple descriptive profile of HRQoL and a single utility index value for health status.
- EQ-5D is a self-reported questionnaire comprising 2 HRQoL valuations:
  a. a visual analog scale recording the respondent’s self-rated, current health status on a 0-100 scale, with higher scores indicating better HRQoL.
  b. a profile of 5 health dimensions that is converted into an index without a von Neumann-Morgenstern utility value for current health.
     1. Mobility
     2. Self-care
     3. Usual activities
     4. Pain and discomfort
     5. Anxiety and depression

**Statistical Analyses**

- US population weights were used to compute EQ-5D utility scores.
- ANOVA with Fisher’s least significant difference post-hoc testing was performed to compare mean EQ-5D scores across T2D, high-risk and low-risk groups.
- Statistical significance was selected a priori as p<0.01.

**RESULTS**

- A total of 14,965 respondents completed the EQ-5D at baseline.

**Table 1. Baseline characteristics of SHIELD respondents who completed the EQ-5D**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>T2D</th>
<th>High Risk</th>
<th>Low Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>50.3 (13.1)</td>
<td>58.9 (14.6)</td>
<td>47.0 (16.4)</td>
</tr>
<tr>
<td>Women, %</td>
<td>280 (57.6%)</td>
<td>307 (59.7%)</td>
<td>372 (65.9%)</td>
</tr>
<tr>
<td>Race, whites</td>
<td>3320 (84.9%)</td>
<td>4749 (85.4%)</td>
<td>5014 (88.3%)</td>
</tr>
<tr>
<td>Education, %</td>
<td>2488 (68.3%)</td>
<td>3651 (67.3%)</td>
<td>4204 (74.0%)</td>
</tr>
<tr>
<td>Income, % with &lt;$40,000</td>
<td>5202 (52.9%)</td>
<td>5259 (46.6%)</td>
<td>5079 (36.6%)</td>
</tr>
<tr>
<td>Geographic region, %</td>
<td>744 (19.9%)</td>
<td>1068 (19.8%)</td>
<td>1077 (17.8%)</td>
</tr>
<tr>
<td>Women, %</td>
<td>914 (23.5%)</td>
<td>1739 (26.4%)</td>
<td>1451 (25.5%)</td>
</tr>
<tr>
<td>South Central</td>
<td>824 (21.2%)</td>
<td>1078 (19.9%)</td>
<td>1007 (17.7%)</td>
</tr>
<tr>
<td>South Central</td>
<td>879 (14.7%)</td>
<td>915 (16.9%)</td>
<td>937 (16.5%)</td>
</tr>
<tr>
<td>Mountain</td>
<td>213 (3.5%)</td>
<td>313 (5.8%)</td>
<td>407 (7.1%)</td>
</tr>
<tr>
<td>Pacific</td>
<td>275 (4.5%)</td>
<td>672 (12.4%)</td>
<td>810 (14.9%)</td>
</tr>
</tbody>
</table>

**Table 1. Baseline characteristics of SHIELD respondents who completed the EQ-5D**

- **EQ-SD Scores**

  **Figure 1. Mean EQ-5D Visual Analog Scale scores by diabetes risk group**

- **EQ-SD Utility Scores**

  **Figure 2. Mean EQ-5D Utility Index scores by diabetes risk group**

- **EQ-SD Utility Scores**

  **Figure 2. Mean EQ-5D Utility Index scores by diabetes risk group**

**LIMITATIONS**

- Household panels, like the SHIELD study, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals.

**SUMMARY/CONCLUSIONS**

- **EQ-SD scores**, whether measured by VAS or utility index, were substantially higher in the respondents with low cardiometabolic risk than those in the high cardiometabolic risk or T2D groups.
- Respondents with low cardiometabolic risk had the lowest proportion of self-reported difficulties in all 5 health dimensions, compared with respondents with T2D or high cardiometabolic risk.
- T2D and high-risk groups had similar health profiles and overall scores, although T2D respondents had lower overall HRQoL.
- In conclusion, even without a diagnosis of diabetes mellitus, those at high cardiometabolic risk experienced decreased HRQoL.
- Reducing cardiometabolic risk factors may lead to significant improvements in HRQoL even before diabetes is diagnosed.

**Abbreviations**

- EQ-SD: EQ-5D-3L utility index
- High risk: respondents with at least some problem with health status
- T2D: type 2 diabetes
- BMI: body mass index
- EQ-5D-3L: EQ-5D-3L utility index
- SHIELD: Study to Help Improve Early Evaluation and management of risk factors Leading to Diabetes
- T2D: type 2 diabetes
- VAS: Visual analog scale

**References**


This research was supported by AstraZeneca Pharmaceuticals LP.
Presented at the ISPOR 12th Annual International Meeting, May 19-23, 2007, Arlington, VA, USA