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

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BACKGROUND

- Diabetes and its complications substantially affect patients' HRQoL[1-2]
- 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
  - Generic measures are useful in estimating the incremental burden of diabetes compared to those with similar comorbidities and risk factors but 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 a 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 3-5 cardiometabolic risk factors, which included:
   a. Abdominal obesity: waist circumference >97 cm in men, >89 cm in women
   b. BMI ≥28 kg/m^2
   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[3], 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 visual analog scale recording the respondent's self-rated, current health status on a 0-100 scale, with higher scores indicating better HRQoL; and
  - a profile of 5 health dimensions that is converted into an index score representing 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 index scores
- Mean EQ-5D VAS and utility scores were computed
- 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 14,995 respondents completed the EQ-5D at baseline

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

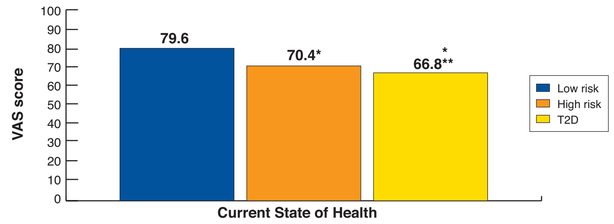
Characteristics	T2D N=3,889	High Risk N=5,425	Low Risk N=5,681
Age, mean (SD)	60.3 (13.1)	58.9 (14.6)*	47.0 (16.4)*
Women, %	2250 (57.9%)	3076 (56.7%)	3725 (65.6%)*
Race, % whites	3302 (84.9%)	4794 (88.4%)*	5014 (88.3%)*
Education, % with some college or higher	2486 (63.9%)	3651 (67.3%)*	4204 (74.0%)*
Income, % with <$40,000	2052 (52.8%)	2529 (46.6%)*	2079 (36.6%)*
Geographic region, %			
Northeast	774 (19.9%)	1066 (19.6%)	1071 (18.8%)
North Central	914 (23.5%)	1379 (25.4%)	1451 (25.5%)
South Atlantic	824 (21.2%)	1077 (19.9%)	1007 (17.7%)*
South Central	676 (17.4%)	915 (16.9%)	937 (16.5%)
Mountain	213 (5.5%)	313 (5.8%)	405 (7.1%)
Pacific	488 (12.5%)	675 (12.4%)	810 (14.3%)

* p value <0.05 for comparison with T2D

- T2D respondents were older compared with high- and low-risk respondents
- A significantly lower proportion of T2D respondents were white, had some college education, and income >$40,000, compared with high- and low-risk respondents

EQ-5D Scores

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



*p<0.004, T2D vs. Low risk and High risk vs. Low risk
**p<0.004, T2D vs. High risk

- Average VAS scores for T2D and high-risk respondents were substantially lower than low-risk respondents (Fig. 1)
- Average VAS score for T2D respondents was significantly lower than high-risk respondents
- Greater proportion of low-risk (34.5%) respondents rated their current state of health >90 on the VAS, compared with 13.9% of T2D and 17.7% of high-risk respondents
- Similar proportions of T2D and high-risk respondents (~20% each) reported a health status rating of 70-79, compared with 14.9% of low-risk respondents

*Table 2. EQ-5D dimensions of health: Proportion of SHIELD respondents with at least some problem^*

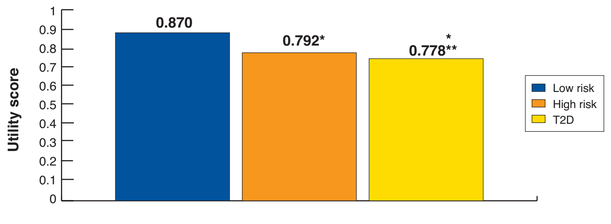
Dimension	T2D	High Risk	Low Risk
Mobility			
N	3,884	5,413	5,673
% with problem	47.9%	43.4%	17.1%
Self-care			
N	3,876	5,419	5,675
% with problem	8.5%	6.5%	2.7%
Performing usual activities			
N	3,880	5,415	5,668
% with problem	36.1%	33.3%	15.7%
Pain or discomfort			
N	3,875	5,411	5,671
% with pain/discomfort	61.1%	61.8%	43.5%
Anxious or depressed			
N	3,877	5,405	5,661
% anxious/depressed	26.1%	24.9%	19.9%

^ % responding some or unable, or moderately/extremely

- T2D and high-risk respondents had similar scores and proportions of individuals with problems on each dimension, with both groups impacted more than the low-risk respondents
- The largest difference among groups was a decrement in mobility: 47.9%, 43.4%, and 17.1% for the T2D and high- and low-risk groups, respectively
- Proportions of respondents reporting some problems with washing and dressing self were generally low across all groups, although higher in T2D and high-risk groups, compared with low-risk group
- A greater proportion of T2D (10.5%) and high-risk (9.4%) respondents also reported extreme pain or discomfort, compared with low-risk respondents (4.2%)

EQ-5D Utility Scores

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



*p<0.004, T2D vs. Low risk and High risk vs. Low risk
**p<0.004, T2D vs. High risk

- Average EQ-5D utility scores for T2D and high-risk respondents were substantially lower than for low-risk respondents (Fig. 2)
- Average utility score for T2D respondents was significantly lower than the mean score for high-risk respondents

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-5D 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

Abbreviation	Definition
ANOVA	Analysis of Variance
BMI	Body mass index
EQ-5D	EuroQoL - 5 dimensions
HRQoL	Health-related quality of life
SHIELD	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes
T2D	Type 2 diabetes
VAS	Visual analog scale

References

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