

# Prediction of Hypoglycemia By Quality of Life Measures: A Retrospective Analysis of Electronically Patient-Reported Data

[Lima Lawrence](#)<sup>1</sup>, [Khawla F Ali](#)<sup>2</sup>, [Lauren Buehler](#)<sup>1</sup>, [Richard Bailey](#)<sup>3</sup>, [James Bena](#)<sup>4</sup>, [Ronald R Gambino](#)<sup>1</sup>, [Marwan Hamaty](#)<sup>5</sup>

## Affiliations

- <sup>1</sup>From the Endocrinology and Metabolism Institute, Cleveland Clinic, Cleveland, Ohio.
- <sup>2</sup>The Royal College of Surgeons in Ireland, Medical University of Bahrain
- <sup>3</sup>the School of Medicine, Case Western Reserve University, Cleveland, Ohio.
- <sup>4</sup>the Section of Biostatistics, Quantitative Health Sciences, Cleveland Clinic, Cleveland, Ohio.
- <sup>5</sup>From the Endocrinology and Metabolism Institute, Cleveland Clinic, Cleveland, Ohio.

**Objective:** We aimed to examine the utility of electronically patient-reported data (e-PRD) in exploring the risk of diabetes-related hypoglycemia and to evaluate hypoglycemia prediction by the quality of life (QoL) measures.

**Methods:** A retrospective analysis of e-PRD for patients with diabetes mellitus who completed the American Diabetes Association's Low Blood Sugar Questionnaire (Hypo-Q) and the Patient-Reported Outcomes Measurement Information System (PROMIS) for QoL assessment. Associations between Hypo-Q answers and PROMIS scores were described using Spearman correlations and 95% confidence intervals, or medians and quartiles.

**Results:** Records of 538 subjects were reviewed; 55% were female, 95% were non-Hispanic, with a mean age ( $\pm$  SD) of  $53 \pm 15$  years. Patients with type 1 diabetes had a longer disease duration and more hypoglycemic episodes ( $P < .001$ ) with higher PROMIS Physical and Mental T-scores ( $P < .001$ , both), when compared to patients with type 2 diabetes. The latter had a higher number of co-existing conditions. Having  $>5$  episodes of either moderate or severe hypoglycemia in a year were reported by 18% and 5% of all patients, respectively. Mean PROMIS Physical and Mental health T-scores were  $46 \pm 10$  and  $47 \pm 10$ , respectively. Patients with fewer moderate and severe hypoglycemic episodes had better Physical ( $P = .047$  and  $P < .001$ ) and Mental ( $P = .015$  and  $P < .001$ ) PROMIS T-scores with incremental decreases in the odds of hypoglycemia with each point increase in PROMIS T-scores.

**Conclusion:** e-PRD of QoL measures and Hypo-Q were effective in exposing the risks for hypoglycemia and reproducing published findings with significant associations between QoL measures and hypoglycemia risks while providing new insights.