Patients' Preferences for Newer Second-line Antihyperglycemic Agents

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Background/Objectives

- Centers for Disease Control and Prevention (CDC) estimated over 34.2 million (10.5%) U.S. population had diabetes mellitus (DM), with 90-95% type 2 DM (T2DM).[1]
- Glycemic control with first line therapy, e.g., Metformin in T2DM may not be adequate, requiring second-line therapy.[2]
- Sodium-glucose cotransporter-2 inhibitors (SGLT2is) and glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are the second-line therapy for T2DM with various benefits and risks.[2]
- The objective of this study was to determine patients' preferences for the attributes of SGLT-2is and GLP-1RAs.

Methods

Study design
- A cross-sectional, web-based discrete choice experiment (DCE) questionnaire survey.
- Followed DCE user guide and The Professional Society for Health Economics and Outcomes Research (ISPOR) good research practices[3-5]

Selection of study attributes and levels
- Literature review, in-depth interviews with five T2DM patients, and best-worst scaling (BWS) object case[6] were conducted to identify the attributes of SGLT-2is and GLP-1RAs.

Instrument Development
- A Bayesian efficient design was used to generate four blocks of nine choice sets (total=36 choice sets) using Ngene® software.
- Each choice contained two unlabeled and an opt-out alternative.
- Survey was validated by experts and piloted among 30 patients.

Data Collection
- *Population:* T2DM patients aged 19 years or older, and proficient in English.
- *Sample size:* Minimum 156 patients at 0.05 significance level and power=80%.[7,8]
- *Recruitment:* National, online Qualtrics[XM] panel.

Data Analysis
- Descriptive analyses of patients' characteristics.
- Mixed logit (ML) model: Likelihood ratio tests to determine final model and Wald tests for differences between adjacent levels of the study attributes.
- Latent class (LC) model: Consistent Akaike Information Criterion (CAIC) to determine the optimal number of classes.
- The level of statistical significance at 0.05.

Results

Patient Characteristics
- A total of 176 T2DM patients were included in our analysis with the average age of 60.4 (SD=13.7) years old.
- Majority were white, non-Hispanic (86.9%), female (54.6%), retired (48.9%), had annual household income of $50,000 or higher (48.9%), had an education level higher than high school (74.4%).
- Average BMI was 32.6 (SD=9.1) and majority (47.2%) had not previously used SGLT-2is or GLP-1 RAs.

Mixed logit (ML) model
- *Conditional relative importance*: Out-of-pocket cost attribute was the most important (2.2), followed by the chance of reaching target HbA1c in six months (1.4), the route and frequency of administrations (0.8), % reduction in the risk of major adverse cardiovascular events or MACE (0.7), the chance of gastrointestinal (GI) side effects (0.6), and the chance of genital infection (0.4).
- Preference heterogeneity was observed.

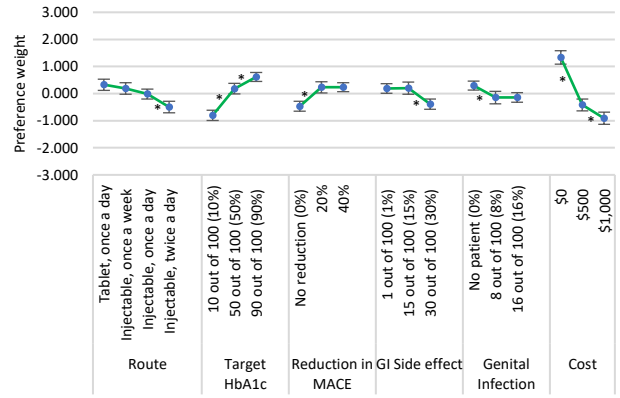

Figure 1: Relative preference weights for SGLT2is and GLP-1 RAs from mixed logit model

Latent Class (LC) model
- Best LC model revealed two patient classes and compared to the patients in class 2, the patients in class 1 were older and had a higher number of comorbidities i.e., Class 1: 65 years, 3 comorbidities; Class 2: 56 years, 2 comorbidities.
- *Conditional relative importance of Class1 vs 2*: Out-of-pocket attribute was the most important (3.3 vs 0.9), followed by the chance of reaching target HbA1c in six months (1.7 vs 0.7), the route and frequency of administrations (1.2 vs 0.4), the chance of genital infection (0.9 vs 0.2), % reduction in the risk of MACE (0.7 vs 0.4), and the chance of GI side effects (0.6 vs 0.4).

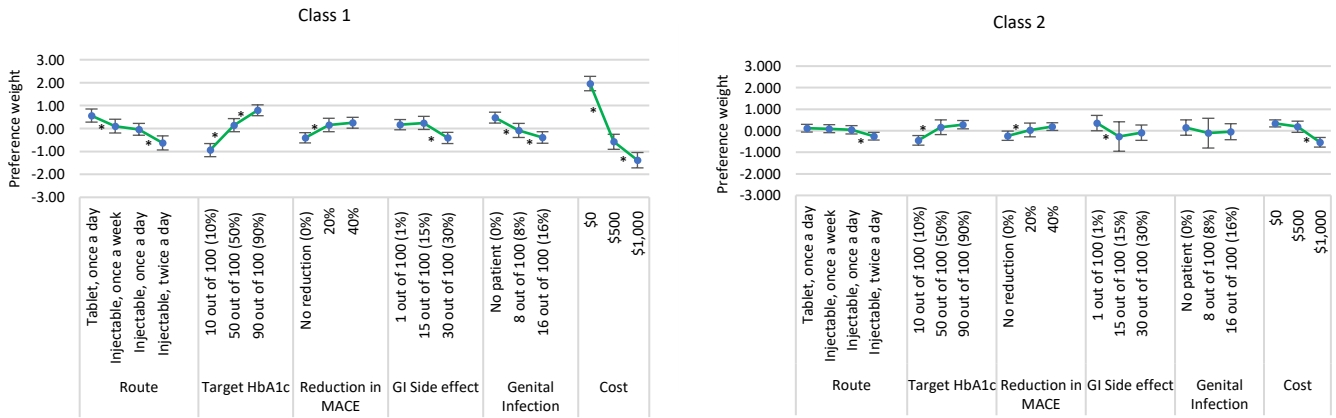

Figure 2: Relative preference weights for SGLT2is and GLP-1 RAs from latent class model

Conclusion

- All six study attributes were significant for the patients' preferences while selecting SGLT-2is and GLP-1RAs. However, their relative importance varied.
- Preference heterogeneity was observed, indicating patients with observed and unobserved characteristics weighed the importance of the treatment attributes differently.
- Older patients or patients with higher number of comorbidities were more sensitive to treatment attribute (e.g., cost) when choosing SGLT-2is and GLP-1RAs as second-line treatments.

Clinical and Policy Implication
- Healthcare providers can use preference information to support treatment decisions or develop treatment guidelines. For instance, older patients may prefer treatments with low or without genital infection as a common side effect.
- Healthcare payers may incorporate patients' preferences information for formulary development to improve patients access to preferred treatments.

Limitations
- Samples recruited from an online panel might not represent the U.S. T2DM patient population.
- Patients stated their preferences from hypothetical treatment choices.
- Only six attributes were included.

References

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