A descriptive analysis of medication selection in type 2 diabetes mellitus: associations with sociodemographics and outcomes

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Background

- Type 2 diabetes mellitus (T2DM) accounts for approximately 90% to 95% of all diabetes cases globally with estimates ranging from 589 million to 828 million people affected worldwide.[1]
- In 2023 in the United States, T2DM was associated with an estimated $412.9 billion economic burden, including $306.6 billion in direct medical costs and $106.3 billion in indirect medical costs.[2]
- The incidence of diagnosis and complications related to T2DM is increased in adults aged over 65, Black populations, and individuals of lower socioeconomic status.[3]
- Published reports indicate that individuals with T2DM are at increased risk of developing comorbidities.[3,4] The American Diabetes Association (ADA) outlines standards of care for managing comorbid conditions, including obesity, atherosclerotic cardiovascular disease (ASCVD), chronic kidney disease (CKD), heart failure (HF), and metabolic-associated steatohepatitis (MASH).[5]
- Demographic factors, including race, gender, age, and socioeconomic status have been associated with differences in prescribing patterns for diabetes medications.[6,7,8]

Objectives

- Explore the associations of medication selection with:
  - Comorbidities
  - Sociodemographics
  - Adherence
  - Biomarkers

Methods

- Members with ≥1 pharmacy claim for a diabetes medication between 7/1/2022 and 6/30/2025 were identified and an index date was determined as the first diabetes medication fill date within the study period.
- Inclusion criteria required that members be adults on the index date, have a diagnosis of T2DM within 90 days before or after the index date, and have no diabetes medication claims in the 6 months prior to the index date.
- Comorbidities (obesity, ASCVD, CKD, HF, MASH) were assessed within 90 days before and after the index date.
- Members were grouped by race, gender, and age generation based on self-reported characteristics.
- Socioeconomic status was measured using social vulnerability index (SVI) data at the census tract level. Members were assigned to quartiles based on the density of vulnerable households.
- Selection of index medication was evaluated by comorbidities, race, gender, generation, and socioeconomic status.
- Adherence (defined as proportion of days covered (PDC) ≥80%) was measured over 180 days from the index date.
- Biomarker values were measured at baseline (latest value during 90 days prior to index) and post medication start (value closest to 180 days from index but within a period of 90-270 days from index). Biomarker values categorized as controlled (<7%) and uncontrolled (≥7%) A1C were compared between baseline and post medication start for members utilizing Biguanide, GLP1, or SGLT2i.

Results

Figure 1. Index Medication by Comorbidity

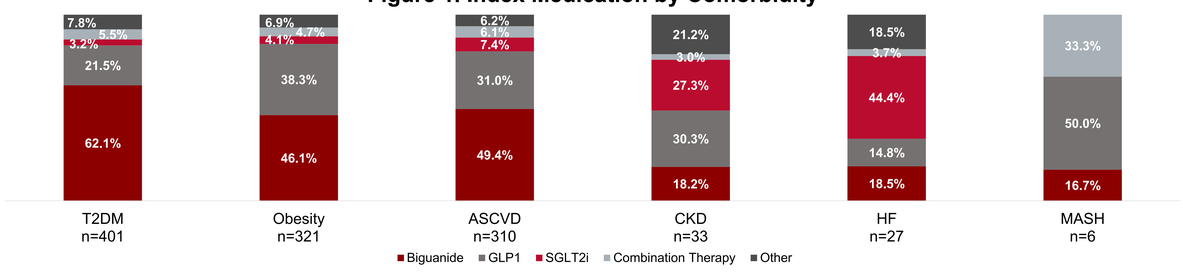


Figure 2. Index Medication by Race

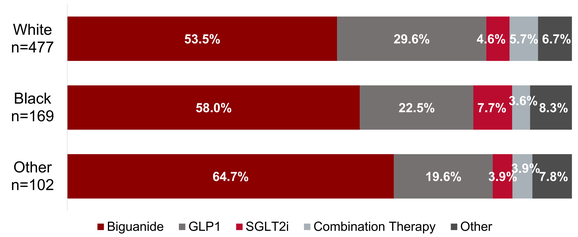


Figure 3. Index Medication by Gender

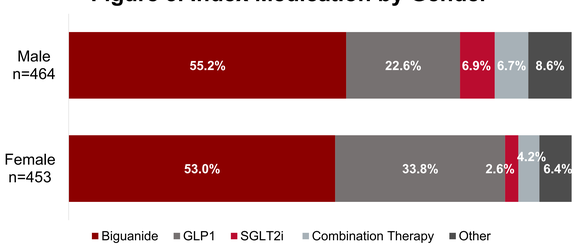


Figure 4. Index Medication by Generation

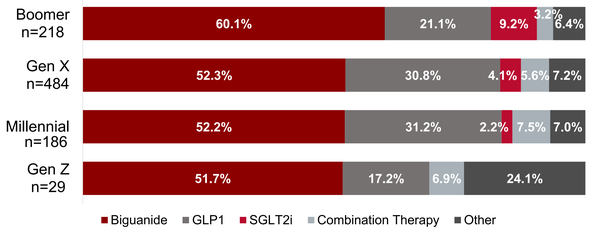


Figure 5. Index Medication by SVI

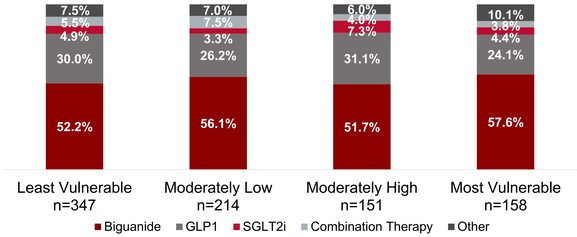


Figure 6. Adherence of Biguanide vs. GLP1
(PDC ≥ 80%)

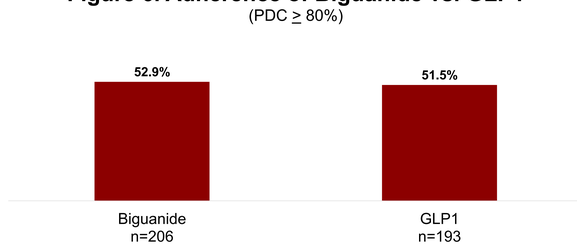
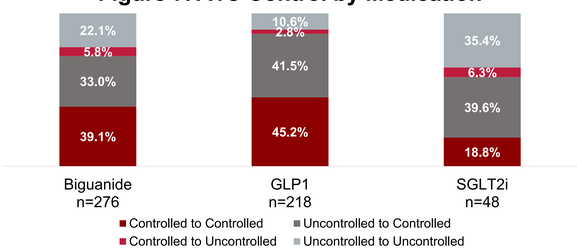


Figure 7. A1C Control by Medication



Discussion

- ADA guidelines recommend therapy based on comorbidities. Metformin is first-line for T2DM, with GLP1s strongly recommended for glucose-lowering effects. GLP1s are preferred first-line therapy for obesity and MASH. GLP1s or SGLT2is are indicated for ASCVD, HF, or CKD.[5] This study's medication initiation patterns largely aligned with published recommendations [Figure 1].
- Current guidelines suggest considering initial combination therapy for individuals with A1C levels ≥1.5% above goal[5]; yet study findings indicated that members meeting these criteria were frequently not initiated on combination therapy. Among those initiated on combination therapy, the most common regimens included Biguanide with GLP1 or insulin [Figure 1].
- A prior study demonstrated increased first-line SGLT2i use among Black individuals.[6] Consistent with these findings, Black members exhibited the highest utilization rates at index [Figure 2]. Women have previously been found to be more likely to initiate GLP1s as first-line therapy,[6] which was shown by the greater initiation rates in women compared to men [Figure 3]. Older adults have been generally prescribed metformin as first-line therapy, as shown in a published study.[7] The trend was aligned in this study [Figure 4].
- Lower socioeconomic status has been associated with reduced probability of initiating GLP1 therapy,[8] which is reflected in slightly lower GLP1 initiation rates found in this study [Figure 5].
- While existing research reports higher adherence for oral diabetes medications compared to injectables,[9] similar adherence rates were observed between Biguanide and GLP1 in this study [Figure 6].
- GLP1 therapies, in combination with metformin, have been found to be effective in achieving and maintaining A1C control in a previous study,[9] GLP1 control was consistent with findings in this analysis [Figure 7].

Limitations

- The cohort sizes for certain comorbidities were small, resulting in limited generalizability to other populations.
- Utilizing census tracts to determine social vulnerability did not allow for identification of individual member characteristics.
- Both pre-A1C and post-A1C readings were not available for all members, limiting assessment of A1C changes over time.

Conclusions

- Biguanides were the most prescribed index medication, followed by GLP1s.
- Initiation of SGLT2i therapy was highest in Black, male, and Boomer generation populations.
- GLP1 initiation was lowest in the most vulnerable socioeconomic quartile.

References

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