Association of FreeStyle Libre Utilization and Glycemic Outcomes among People with Type 2 Diabetes Treated with Basal Insulin and Glucagon-like Peptide-1 Receptor Agonists

Eileen Huang[1], Kalvin Kao[1], Laura Brandner[1], Anila Bindal[1]
[1] Abbott Diabetes Care, Alameda, CA, USA

Background

- Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are a class of medication that is highly effective at treating Type 2 diabetes (T2D) due to its glucose-lowering ability.[1, 2]
- Although people with T2D treated with basal insulin may use both GLP-1 RA and Freestyle Libre (FSL) glucose monitors for diabetes management,[3] the impact of FSL utilization on glycemic outcomes in the presence of GLP-1 RAs has not been widely studied.

Study objective:

To assess the impact of FSL utilization on glycemic outcomes among people living with T2D and treated with basal insulin and GLP-1 RAs.

Methods

Study design:

We conducted a retrospective real-world cohort study using a linked database of two de-identified data sources:

1) **LibreView:** longitudinal continuous glucose values of FSL users in the United States
2) **Inovalon Insights:** closed administrative health insurance claims in the United States

Records were linked using Datavant's de-identification and linking technology for structured data.[4] The linked database is certified via expert determination as required under the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule. The expert determination was performed by Datavant Privacy Hub, where an expert statistician certified that enough identifying data elements have been removed from LibreView and Inovalon Insights that there is a "very small risk" that a recipient or data analyst could identify an individual.

Study population:

Inclusion criteria:
- T2D diagnosis
- ≥18 years old
- Initiated FSL between November 2017 and March 2022
- Active GLP-1 RAs users: had claim(s) of GLP-1 RAs within 28 days prior to FSL initiation
- Active basal insulin users: had claim(s) of basal insulin within 180 days prior to FSL initiation
- Had continuous Rx insurance coverage 180 days prior and 12 months after FSL initiation

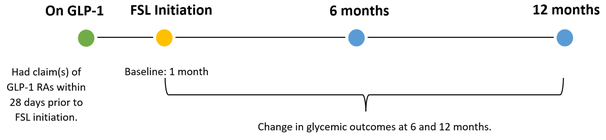
Exclusion criteria:
- Diagnosed with type 1 diabetes
- Diagnosed with gestational diabetes
- Had claim(s) of bolus or premixed insulin within 180 days prior to FSL initiation

Definitions:
- **Proportion of days covered (PDC) for FSL**: proportion of days with FSL glucose reading within 12 months post FSL initiation.
- **PDC for GLP-1 RAs**: proportion of days' supply for all fills of GLP-1 RAs within 12 months post FSL initiation.
- **Consistent FSL utilization**: ≥80% PDC
- **Inconsistent FSL utilization**: <80% PDC
- **Adherent to GLP-1 RAs**: ≥80% PDC
- **Not adherent to GLP-1 RAs**: <80% PDC

Analysis:

- Glucose management indicator (GMI) and % time in range 70-180 mg/dL (TIR) were calculated at baseline, 6-, and 12-months post FSL initiation.
- Change in glycemic metrics from baseline to 12-months were assessed using paired t tests.

Figure 1. Study design



Results

Table 1. Mean difference in GMI from baseline to 12 months, by GLP-1 RA adherence and FSL utilization

GLP-1 RA Adherence	FSL Utilization	Cohort Size (n)	Change from baseline to 12-months	
			ΔGMI (95% CI)	*P* value
Overall	Inconsistent	942	0.27 (0.17, 0.38)	<0.001
	Consistent	1199	0.01 (-0.07, 0.08)	0.853
Non-adherent	Inconsistent	598	0.30 (0.16, 0.44)	<0.001
	Consistent	707	0.02 (-0.08, 0.12)	0.646
Adherent	Inconsistent	344	0.22 (0.06, 0.38)	0.006
	Consistent	492	-0.02 (-0.12, 0.09)	0.755

Table 2. Mean difference in TIR from baseline to 12 months, by GLP-1 RA adherence and FSL utilization

GLP-1 RA Adherence	FSL Utilization	Cohort Size (n)	Difference between baseline and 12-months	
			ΔTIR (95% CI)	*P* value
Overall	Inconsistent	942	-3.94 (-5.61, -2.26)	<0.001
	Consistent	1199	0.22 (-1.06, 1.50)	0.734
Non-adherent	Inconsistent	598	-3.70 (-5.87, -1.54)	<0.001
	Consistent	707	-0.27 (-1.95, 1.40)	0.749
Adherent	Inconsistent	344	-4.34 (-6.97, -1.70)	0.001
	Consistent	492	0.93 (-1.06, 2.92)	0.358

Figure 2. Mean GMI from baseline to 12 months, by GLP-1 RA adherence and FSL utilization

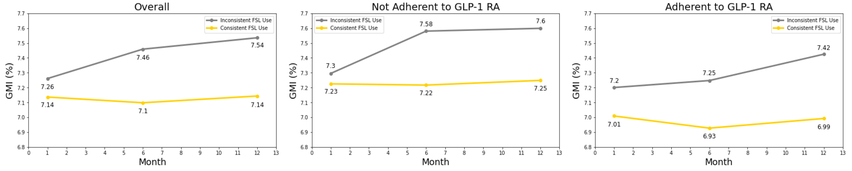
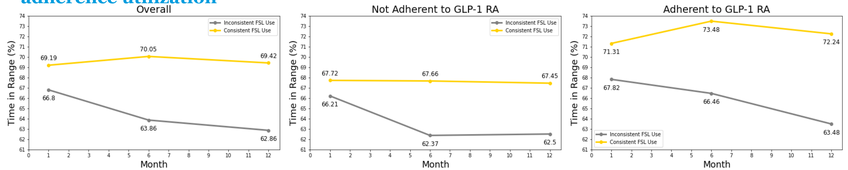


Figure 3. Mean TIR from baseline to 12 months, by GLP-1 RA adherence and FSL adherence utilization



- A total of 2141 individuals met study selection criteria and had glucose data at baseline, 6- and 12-months.

Table 3. Demographics

	Overall	Inconsistent FSL utilization	Consistent FSL utilization
N	2141	942	1199
Age (years, mean ± SD)	55.2 ± 9.4	53.8 ± 9.5	56.3 ± 9.2
Gender			
Female (%)	46.4	47.3	45.6
Male (%)	53.6	52.7	54.4

Conclusions

- To our knowledge, this is the first large 12-month longitudinal real-world study (N = 2141) using a linked dataset of de-identified FSL glucose data and closed administrative claims data in the United States.
- This study shows that **regardless of GLP-1 RAs adherence, consistent FSL use is associated with more sustained and better glycemic control than inconsistent FSL use.**
- Our results indicate that consistent FSL use may play an important role in glucose management among people living with T2D and treated with basal insulin and GLP-1 RAs.

References

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Acknowledgements

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