Baseline BMI and HbA1c Trends in US Diabetic Patients Initiating GLP-1 Therapy: A Retrospective Cohort Study

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RWD171

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Objective: To examine demographic and clinical patterns for baseline BMI and HbA1c levels among diabetic patients initiating GLP-1 or dual GIP/GLP-1 receptor agonists in the US.

Background

Glucagon-like peptide-1 (GLP-1) agonists are a class of medications utilized to treat type 2 diabetes mellitus (T2DM) and obesity. GLP-1 is an incretin hormone inactivated by dipeptidyl peptidase-4 (DPP-4) and stimulates insulin secretion after an oral glucose load via the incretin effect.[1]

A Body Mass Index (BMI) greater than 30 is classified as obese[2] and Glycated Hemoglobin (HbA1c) is correlated with obesity[3] and thus high BMI. With the new GLP-1 launches in obesity in 2021 and 2023, analyzing the patient profiles of GLP-1 initiators are of interest.

Methods

This retrospective cohort study used US claims data from Forian's Data Product, CHRONOS™, a nationally representative, integrated open and closed claims hybrid ecosystem from January 1, 2015 to December 31, 2024.

Adult patients (18+) who were diagnosed with diabetes (ICD-10-CM: E11.0-E11.9) before GLP-1 initiation and had a baseline BMI or HbA1c clinical reading 30 days prior and continuous enrollment up to initial treatment were included.

Demographic and clinical screening characteristics were summarized descriptively using means, standard deviations (SD), and IQR. All study variables were defined by NDC, CPT, HCPCS, and ICD-10-CM codes.

Results

A total of 10,228,304 adult patients (63.05% female) initiated on GLP-1s in the study period; 507,150 (4.96%) patients had baseline BMI measures, and 141,847 (1.39%) patients had HbA1c measures. The mean age at initial GLP-1 treatment was 54.22 (SD: 13.3) years (Figure 3).

In all age groups, women initiated GLP-1 at a lower average HbA1c than men (18-34: 6.7/7.7, 35-49: 7.3/8.2, 50-64: 7.7/8.3, 65+: 7.9/8.2), although that difference shrinks in the older age groups (Figure 4).

31.8% of patients initiated treatment with a BMI >=40 and 83.6% initiated with a BMI >=30, respectively (Figure 5).

Of initiators in the 18-34 age group, 50.4% had a BMI >= 40 whereas only 21.3% of patients who were 65+ had a BMI >= 40 (Figure 5).

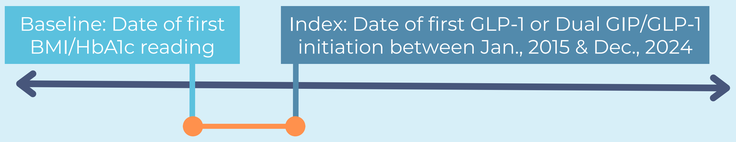

Figure 1. Study Diagram

	Total Cohort (2015-2024)		Patients with BMI (2015-2024)		Patients with HbA1c (2015-2024)	
	N	%	N	%	N	%
Characteristic						
# Patients	10,228,304	100%	507,150	4.96%	141,865	1.39%
Demographics (N, % of patients)						
Mean	54.22	n/a	55.4	n/a	56.53	n/a
18-34	869,572	8.50%	34,799	6.86%	8,064	5.68%
35-49	2,670,785	26.11%	120,852	23.83%	30,537	21.53%
50-64	4,142,573	40.50%	209,926	41.39%	59,958	42.26%
65+	2,545,374	24.89%	141,573	27.92%	43,306	30.53%
Female	6,447,820	63.05%	316,421	62.40%	80,902	57.03%
Male	3,778,393	36.95%	190,675	37.60%	60,945	42.97%

Figure 3. Patient Characteristics

Age Group	Gender	# Patients	Mean (SD)
18-34	F	5,904	6.7 (2.1)
	M	2,160	7.7 (2.3)
	Total	**8,064**	**7.0 (2.2)**
35-49	F	18.568	7.2 (2.1)
	M	11.965	8.2 (2.1)
	Total	**30.537**	**7.6 (2.1)**
50-64	F	33.140	7.7 (1.9)
	M	26.813	8.3 (1.9)
	Total	**59,958**	**8.0 (1.9)**
65+	F	23,290	7.8 (1.7)
	M	20,007	8.1 (1.6)
	Total	**43,306**	**8.0 (1.6)**

Figure 4. Mean HbA1c at GLP-1 initiation, by age and gender

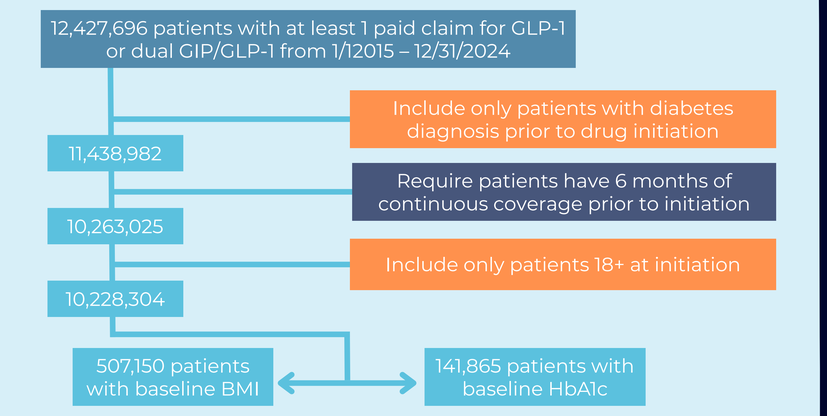

Figure 2. Attrition Criteria and Final Study Sample

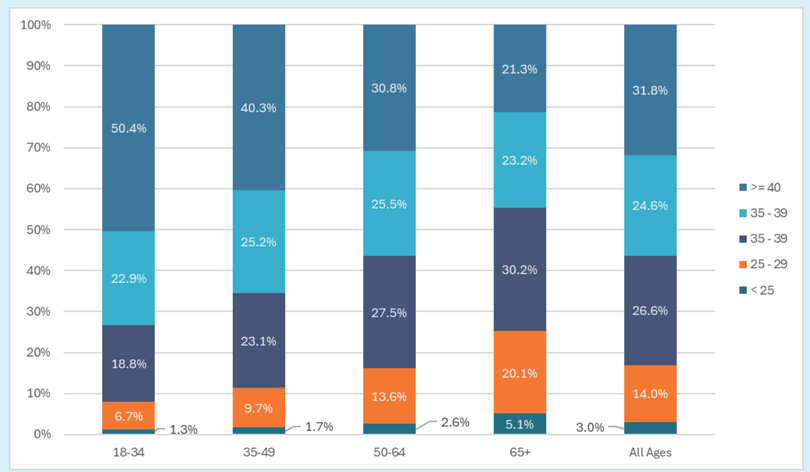

Figure 5. BMI Range, by %, at GLP-1 initiation, by age group

Conclusions

Baseline BMI and HbA1c patterns in GLP-1 users reveal age- and sex-specific trends in the US. Younger patients initiated GLP-1s at higher BMIs than older ones, while women had lower baseline HbA1c than men with the difference shrinking in the older age groups. Additional research will assess longitudinal differences in these patients.

Understanding these differences may inform personalized treatment strategies and highlight cross-national variations in clinical practices.

References

1. Collins L, Costello RA. Glucagon-Like Peptide-1 Receptor Agonists. [Updated 2024 Feb 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK551568/. 2. https://www.cdc.gov/bmi/adult-calculator/bmi-categories.html 3. Hara, K., Hirase, T., Pathadka, S. et al. Trends of HbA1c and BMI in People with Type 2 Diabetes: A Japanese Claims-Based Study. Diabetes Ther 15, 801–817 (2024). https://doi.org/10.1007/s13300-024-01543-4