Real-World Outcomes of Tirzepatide Use in People With HIV With and Without Diabetes

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BACKGROUND

- The use of glucagon-like peptide-1 receptor agonists (GLP-1RAs) in people with HIV (PWH) is growing.
- Several studies have evaluated the use of GLP-1RAs in PWH [1-3] and collectively have shown improvements in reducing weight, body mass index (BMI), hemoglobin A1C (A1C), and visceral adipose tissue (VAT).
- Tirzepatide is a dual GLP-1 and glucose-dependent insulinotropic polypeptide (GIP) agonist, that can help regulate blood sugar, digestion, and appetite [4].
- There are currently no published studies specifically on the use of tirzepatide in PWH.

METHODS

- Retrospective single-center cohort study of 61 PWH who were prescribed tirzepatide between 5/2022 and 12/2024
- People were excluded if they received any other prior GLP-1RA and/or did not have a minimum of 6 months of follow up after initiation of tirzepatide
- Start and end date of tirzepatide use was determined using prescription records
- Baseline demographics were collected (see Table 1)
- Primary outcome measure was absolute weight change
- Secondary outcome measures were changes in BMI, A1C, blood pressure (BP), lipids, and 10-Year Atherosclerotic Cardiovascular Disease (ASCVD) Risk Scores, if available

RESULTS

- 61 PWH were prescribed tirzepatide (22 had concurrent diabetes [PWH/D], 39 did not have diabetes [PWH/nD]
- 26.2% (16/61) of PWH discontinued tirzepatide prior to 1 year: GI side effects (3), non-GI side effects (3), supply issues (2), insurance issues (7), lack of efficacy (1)
- At baseline, PWH/D were statistically significantly more likely to be racially mixed/other race, have hyperlipidemia, and have higher ASCVD risk score
- Mean follow-up time for entire cohort was 15.2 months (16.8 months for PWH/D and 14.3 months for PWH/nD)
- Tirzepatide maximum dosage of 15 mg was reached by 21/61 (34.4%) of cohort, mean dose was 10.8 mg
- **Primary outcome measure:** The mean change in **weight** from baseline to 12 months for the entire cohort was ***-14.5 kg (31.9 lbs)***; ***-10.1 kg (22.2 lbs)*** in PWH/D; ***-17.0 kg (37.4 lbs)*** in PWH/nD (all p<0.001, see Table 2)

Tirzepatide use in PWH led to ***statistically significant reductions*** in body weight, BMI, systolic blood pressure, A1C, and 10-year ASCVD risk scores.
However, 26.2% (16/61) of PWH ***discontinued*** tirzepatide prior to 1 year due to insurance/supply-related challenges.

RESULTS (continued)

TABLE 1 – DEMOGRAPHIC DATA

	ENTIRE COHORT (n=61)	DIABETES (n=22)	NO DIABETES (n=39)	p-value
Median Age (IQR)	51 (39-59)	54 (43-60)	48 (37-59)	0.13
Race (%)				**0.0005**
White	32 (52.5)	4 (18.2)	28 (71.8)	
Black	7 (11.5)	3 (13.6)	4 (10.3)	
Asian	3 (4.9)	2 (9.1)	1 (2.6)	
Mixed/Other	19 (31.1)	13 (59.1)	6 (15.4)	
Ethnicity (%)				0.06
Hispanic	26 (42.6)	13 (59.1)	13 (33.3)	
Non-Hispanic	34 (55.7)	9 (40.9)	25 (64.1)	
Other/Unknown	1 (1.5)	0 (0.0)	1 (2.6)	
Sex Assigned at Birth (%)				0.77
Female	18 (29.5)	6 (27.3)	12 (30.8)	
Gender Identity (%)				0.51
Male	41 (67.2)	16 (72.7)	25 (64.1)	
Female	18 (29.5)	6 (27.3)	12 (30.8)	
Transgender	2 (3.3)	0 (0.0)	2 (5.1)	
HIV Viral load<50 at start (%)	52 (85.2)	17 (77.3)	35 (89.7)	0.19
Median baseline CD4 count (IQR)	729 (517-999)	610 (517-761)	802 (460-1133)	0.14
ART Regimen (%)				0.39
INSTI+2 NRTI	39 (63.9)	16 (72.7)	23 (59.0)	
NNRTI+2 NRTI	4 (6.6)	2 (9.1)	2 (5.1)	
PI+2 NRTI	4 (6.6)	0 (0.0)	4 (10.3)	
2-drug oral regimen	1 (1.6)	0 (0.0)	1 (2.6)	
LAI CAB/RPV	8 (13.1)	2 (9.1)	6 (15.4)	
Multi-class	3 (4.9)	2 (9.1)	1 (2.6)	
None	2 (3.3)	0 (0.0)	2 (5.1)	
2nd gen INSTI based regimen (%)	42 (68.9)	18 (81.8)	24 (61.5)	0.1
Tenofovir exposure (%)				0.41
TDF	1 (1.6)	1 (4.5)	0 (0.0)	
TAF	46 (75.4)	16 (72.7)	30 (76.9)	
none	14 (23.0)	5 (22.7)	9 (23.1)	
TAF+2nd gen INSTI	38 (62.3)	15 (68.2)	23 (59.0)	0.48
Comorbidities (%)				
Hypertension	37 (60.7)	14 (63.6)	23 (59.0)	0.72
Diabetes	22 (36.1)			
Hyperlipidemia	31 (50.8)	18 (81.9)	13 (33.3)	**0.0002**
MASLD	17 (27.9)	6 (27.3)	11 (28.2)	0.94
OSA	21 (34.4)	4 (18.2)	17 (43.6)	0.05
CVD	9 (14.8)	6 (27.3)	3 (7.7)	0.06
Median baseline ASCVD risk score (IQR)	8.3 (3.6-14.2)	14.1 (5.5-19.8)	6.7 (2.7-10.4)	**0.02**
Median BMI (IQR)	33.1 (31.0-39.5)	32.9 (30.9-35.9)	35.1 (31.5-40.1)	0.1

IQR = Interquartile range, ART = Antiretroviral Therapy, INSTI = Integrase Strand Transfer Inhibitor, NRTI = Nucleoside Reverse Transcriptase Inhibitor, NNRTI = Non-nucleoside Reverse Transcriptase Inhibitor, LAI = Long-Acting Injection, CAB = Cabotegravir, RPV = Rilpivirine, TDF = Tenofovir disoproxil fumarate, TAF = Tenofovir alafenamide, MASLD = Metabolic Dysfunction-Associated Steatotic Liver Disease, OSA = Obstructive Sleep Apnea, CVD = Cardiovascular Disease, BMI = Body Mass Index

TABLE 2 – PRIMARY OUTCOME – Absolute Weight Change

ENTIRE COHORT	Baseline (n=61)	3-months (n=52)	6-months (n=45)	9-months (n=38)	12-months (n=41)
Mean wt (kg)	105.7	96.8	93.5	90.1	90.4
Mean Δ wt from BL (kg)	n/a	**-7.2**	**-12.2**	**-13.2**	**-14.5**
p-value		**<0.001**	**<0.001**	**<0.001**	**<0.001**
DIABETES	**Baseline (n=22)**	**3-months (n=19)**	**6-months (n=19)**	**9-months (n=14)**	**12-months (n=15)**
Mean wt (kg)	98.8	88.7	90.7	93.3	91.3
Mean Δ wt from BL (kg)	n/a	**-5.6**	**-10.1**	**-8.7**	**-10.1**
p-value		**<0.001**	**<0.001**	**<0.001**	**0.001**
NO DIABETES	**Baseline (n=39)**	**3-months (n=33)**	**6-months (n=26)**	**9-months (n=24)**	**12-months (n=26)**
Mean wt (kg)	109.6	101.4	91.9	88.2	89.9
Mean Δ wt from BL (kg)	n/a	**-8.1**	**-13.8**	**-15.7**	**-17.0**
p-value		**<0.001**	**<0.001**	**<0.001**	**<0.001**

Wt = weight, BL = baseline

TABLE 3 – Weight Loss stratified by Percent Body Weight (BW) Loss

ENTIRE COHORT	3-months (n=52)	6-months (n=45)	9-months (n=38)	12-months (n=41)	Last weight (n=57)
>5% BW	30 (57.7)	39 (86.7)	32 (84.2)	32 (78.0)	47 (82.5)
>10% BW	13 (25)	26 (57.8)	25 (65.8)	26 (63.4)	35 (61.4)
>15% BW	5 (9.6)	15 (33.3)	13 (34.2)	18 (43.9)	25 (43.9)
>20% BW	2 (3.8)	4 (8.9)	8 (21.1)	12 (29.3)	14 (24.6)
>25% BW	0 (0.0)	2 (4.4)	5 (13.2)	5 (12.2)	9 (15.8)
>30% BW	0 (0.0)	1 (2.2)	1 (2.6)	4 (9.8)	5 (8.8)
DIABETES	**3-months (n=19)**	**6-months (n=19)**	**9-months (n=14)**	**12-months (n=15)**	**Last weight (n=20)**
>5% BW	10 (52.6)	15 (78.9)	11 (78.6)	10 (66.7)	16 (80.0)
>10% BW	3 (15.8)	10 (52.6)	6 (42.9)	7 (46.7)	11 (55.0)
>15% BW	0 (0.0)	4 (21.1)	3 (21.4)	4 (26.7)	6 (30.0)
>20% BW	0 (0.0)	1 (5.3)	1 (7.1)	3 (20.0)	2 (10.0)
>25% BW	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.7)	1 (5.0)
>30% BW	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.7)	0 (0.0)
NO DIABETES	**3-months (n=33)**	**6-months (n=26)**	**9-months (n=24)**	**12-months (n=26)**	**Last weight (n=37)**
>5% BW	20 (60.6)	24 (92.3)	21 (87.5)	22 (84.6)	31 (83.8)
>10% BW	10 (30.3)	16 (61.5)	19 (79.2)	19 (73.1)	24 (64.9)
>15% BW	5 (15.2)	11 (33.3)	10 (41.7)	14 (53.8)	19 (51.4)
>20% BW	2 (6.1)	3 (9.1)	7 (29.2)	9 (34.6)	12 (32.4)
>25% BW	0 (0.0)	2 (7.7)	4 (16.7)	4 (15.4)	8 (21.6)
>30% BW	0 (0.0)	1 (3.8)	1 (4.2)	3 (9.1)	5 (13.5)

- **Secondary outcome measures:**
  - The mean change in **BMI** and **systolic BP (SBP)** from baseline to 12 months for the entire cohort was ***–4.8 kg/m2*** (p<0.001) and ***–5.9 mmHg*** (p=0.02), respectively (see Table 4)
  - The mean change in **A1C** from baseline to 12 months for PWH/D was ***–1.6%*** (p=0.005, see Table 4)
  - The mean change in **HDL-cholesterol** and **ASCVD risk score** from baseline to 12 months for the entire cohort was ***+4.7 mg/dL*** (p=0.002) and ***–3.0%*** (p=0.0005), respectively (see Table 5)
- In PWH/D, 12/22 (54.5%) were also receiving other diabetic meds (only 1 person was receiving insulin)
- In 37 people with hypertension, 6 (16.2%) stopped all BP meds, 2 (5.4%) reduced 1 BP med
- In 31 people with hyperlipidemia, 3 (9.7%) stopped their lipid-lowering medication
- At baseline, 10-Year ASCVD risk score was not calculatable as 16 PWH were under age 40 and 1 was missing baseline lipid data; at 12 months, 22 were missing 12-month lipid data

RESULTS (continued)

TABLE 4 – SECONDARY OUTCOMES – BMI, A1C, Blood Pressure (SBP and DBP)

ENTIRE COHORT	Baseline (n=61)	3-months (n=52)	6-months (n=45)	9-months (n=38)	12-months (n=41)
Mean BMI (kg/m^2)	35.4	32.7	31.7	30.2	31.0
Mean Δ in BMI from BL (kg/m^2)	n/a	**-2.4**	**-4.0**	**-4.3**	**-4.8**
p-value		**<0.001**	**<0.001**	**<0.001**	**<0.001**
DIABETES	**Baseline (n=22)**	**3-months (n=10)**	**6-months (n=12)**	**9-months (n=6)**	**12-months (n=10)**
Mean A1C (%)	7.6	6.1	5.9	6.1	5.5
Mean Δ in A1C from BL (%)	n/a	**-1.7**	**-2.2**	-0.9	**-1.6**
p-value		0.005	0.002	N is too small	0.005
ENTIRE COHORT	**Baseline (n=61)**	**3-months (n=51)**	**6-months (n=47)**	**9-months (n=37)**	**12-months (n=41)**
Mean SBP (mmHg)	132.5	121.0	120.5	115.8	124.0
Mean Δ in SBP from BL (mmHg)	n/a	**-11.2**	**-9.7**	**-14.0**	**-5.9**
p-value		**<0.001**	**<0.001**	**<0.001**	**0.02**
ENTIRE COHORT	**Baseline (n=61)**	**3-months (n=51)**	**6-months (n=47)**	**9-months (n=37)**	**12-months (n=41)**
Mean DBP (mmHg)	80.5	77.4	75.9	74.5	76.4
Mean Δ in DBP from BL (mmHg)	n/a	-2.8	-3.3	**-4.0**	-2.7
p-value		0.11	0.06	**0.03**	0.16

BMI = Body Mass Index, BL = Baseline, A1C = Hemoglobin A1C, SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

TABLE 5 – SECONDARY OUTCOMES – Lipids (TC, LDL, HDL), ASCVD Risk Score

ENTIRE COHORT	Baseline (n=59)	12-months (n=33)
Mean TC (mg/dL)	176.7	165.8
Mean Δ in TC from BL (mg/dL)	n/a	-9.0
p-value		0.05
ENTIRE COHORT	**Baseline (n=56)**	**12-months (n=33)**
Mean LDL (mg/dL)	94.8	91.5
Mean Δ in LDL from BL (mg/dL)	n/a	-4.9
p-value		0.38
ENTIRE COHORT	**Baseline (n=59)**	**12-months (n=33)**
Mean HDL (mg/dL)	43.6	50.5
Mean Δ in HDL from BL (mg/dL)	n/a	**4.7**
p-value		**0.002**
ENTIRE COHORT	**Baseline (n=44)**	**12-months (n=22)**
Mean ASCVD risk score (%)	10.7	7.4
Mean Δ in ASCVD Risk Score from BL (%)	n/a	**-3.0**
p-value		**0.0005**

TC = Total Cholesterol, BL = Baseline, LDL = Low-Density Lipoprotein, HDL = High Density-Lipoprotein, ASCVD = Atherosclerotic Cardiovascular Disease

LIMITATIONS

1. Convenience sample, retrospective study, missing data, different indications for starting tirzepatide (obesity vs DM)

CONCLUSIONS

1. PWH who initiated tirzepatide (whether for obesity or for DM) lost mean weight of ~14.5 kg (31.9 lbs) or 13.8% of their baseline total body weight at 12 months
2. This degree of weight loss is slightly less than that seen in people without HIV – 17% weight loss at 12 months [5]
3. As expected, PWH/nD lost more weight than PWH/D
4. Statistically significant reductions were seen in BMI, A1C, SBP with significant increase in HDL; all improvements likely contributed to lowering 10-Year ASCVD risk scores
5. Unfortunately, ~26.2% of PWH discontinued tirzepatide prior to the end of 12 months due to a combination of side effects, insurance and supply-related challenges

REFERENCES

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Plain Language Summary: Tirzepatide is a medication that can help PWH who are obese to lose weight and lower blood sugar in people with diabetes. Our study showed that weight loss with tirzepatide may also lower blood pressure and thus, perhaps, lower the risk of heart disease.