Patients Who Lose Weight After Starting GLP-1s More Likely to See Thyroid Level Improvement

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Key Findings:

- Patients with hypothyroidism who lose more than five pounds after starting a GLP-1 medication experience on average a 0.36 mU/L to 0.55 mU/L reduction of their thyroid-stimulating hormone (TSH) levels.

Previous research has shown conflicting results regarding correlation between GLP-1 medications and thyroid function.[1] Some have theorized that GLP-1 medications may affect metabolic pathways, potentially altering thyroid hormone production.[1] Weight loss has also been correlated with changes in thyroid levels.[2]

We aimed to understand the relationship between GLP-1 medications, weight change, and thyroid-stimulating hormone (TSH) levels. Lower TSH levels indicate improved thyroid function. We studied 21,538 patients with a history of hypothyroidism who were prescribed semaglutide, dulaglutide, liraglutide, or exenatide and stratified them by their weight change after starting the medication. The amount of weight change was calculated using the patient's weight when they started the GLP-1 medication and their weight when a follow-up TSH level was taken. We found that patients who were prescribed semaglutide and lost more than five pounds saw the greatest reduction of their TSH levels, as seen in Figure 1. Patients who gained weight while prescribed any of the GLP-1 medications studied had no statistically significant change in their TSH levels.

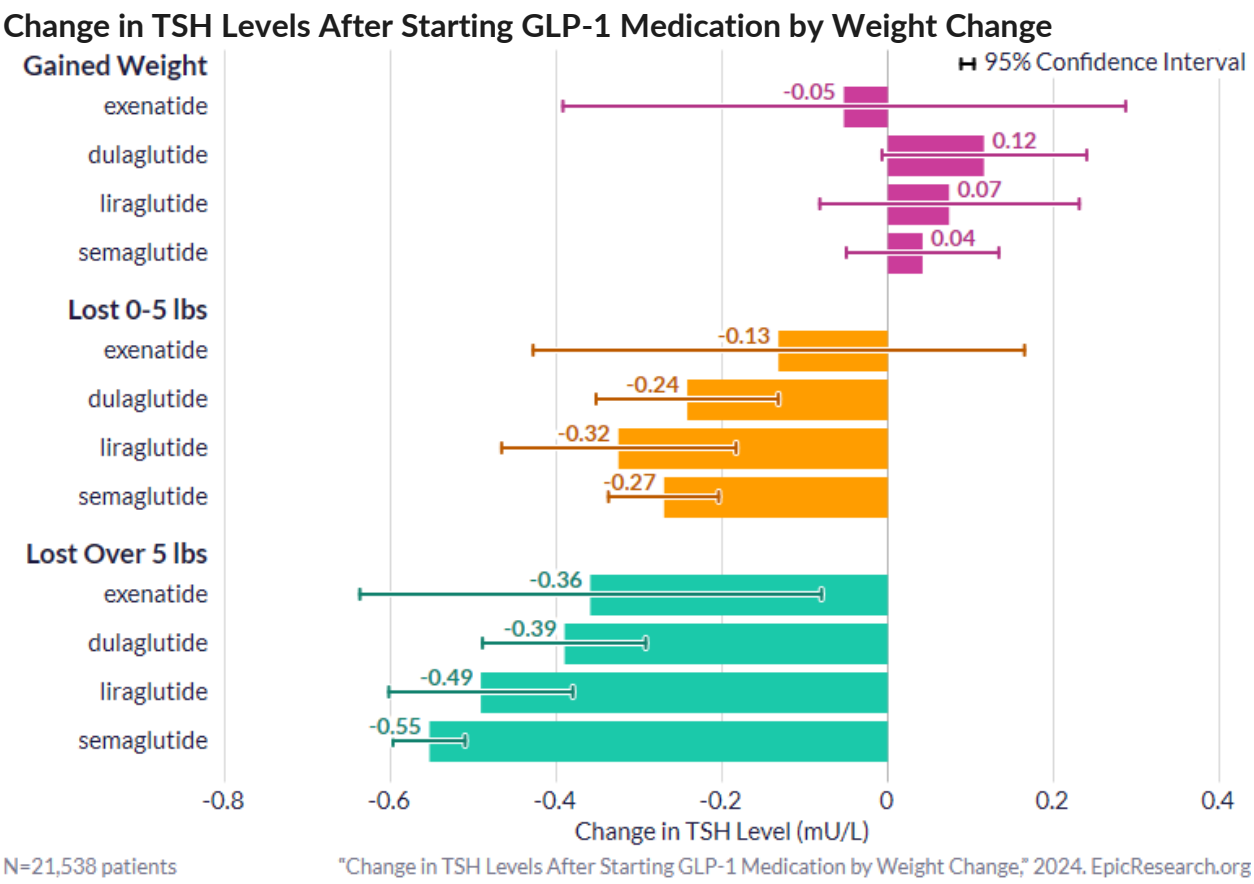

Figure 1. Change in TSH levels after starting a GLP-1 medication by weight change.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 277 million patient records from 1,500 hospitals and more than 36,000 clinics from all 50 US states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Capuccio S, Scilletta S, La Rocca F, Miano N, Di Marco M, Bosco G, Di Giacomo Barbagallo F, Scicali R, Piro S, Di Pino A. Implications of GLP-1 Receptor Agonist on Thyroid Function: A Literature Review of Its Effects on Thyroid Volume, Risk of Cancer, Functionality and TSH Levels. Biomolecules. 2024; 14(6):687. https://doi.org/10.3390/biom14060687
2. Agnihothri RV, Courville AB, Linderman JD, et al. Moderate weight loss is sufficient to affect thyroid hormone homeostasis and inhibit its peripheral conversion. Thyroid. 2014;24(1):19-26. doi:10.1089/thy.2013.0055

Data Definitions

Term	Definition
Study period	1/1/2017 to 7/31/2024
Study population	Patients with **hypothyroidism** who were prescribed a **GLP-1 medication**, with one year of stable **TSH** levels prior:

	• At least two readings in the year • Readings within 25% of each other and below 20 mU/L • No **thyroid hormone medication** changes in that period
GLP-1 medication	Reached one of the following dosages for a GLP-1 medication: • Semaglutide (oral): 7mg, 14mg • Semaglutide (SubQ): 1mg, 2mg, 1.7mg, 2.4mg • Dulaglutide (SubQ): 1.5mg, 0.75mg, 3mg, 4.5mg • Exenatide (SubQ): 2mg, 0.01mg, 0.005mg • Liraglutide (SubQ): 0.6mg, 3mg • Tirzepatide (SubQ): 5mg, 10mg, 15mg
TSH	Lab result with LOINC code 3015-5, 11580-8, 11579-0, or 3016-3 Reported in mU/L
Hypothyroidism	A diagnosis with ICD-10-CM code E03.9
Thyroid hormone medication	Medications with pharmaceutical class of "Thyroid Hormones"

Table 1: Change in TSH Levels After Starting GLP-1 Medication by Weight Change

Category	Study ingredient	Avg. change	95% Lower CI	95% Upper CI	Number of patients
gained weight	dulaglutide	0.12	-0.01	0.24	1,373
lost 0-5 lbs	dulaglutide	**-0.24**	**-0.35**	**-0.13**	1,778
lost over 5 lbs	dulaglutide	**-0.39**	**-0.49**	**-0.29**	1,922
gained weight	exenatide	-0.05	-0.39	0.29	163
lost 0-5 lbs	exenatide	-0.13	-0.43	0.17	206
lost over 5 lbs	exenatide	**-0.36**	**-0.64**	**-0.08**	200
gained weight	liraglutide	0.07	-0.08	0.23	787
lost 0-5 lbs	liraglutide	**-0.32**	**-0.47**	**-0.18**	1,014
lost over 5 lbs	liraglutide	**-0.49**	**-0.60**	**-0.38**	1,250
gained weight	semaglutide	0.04	-0.05	0.13	2,205
lost 0-5 lbs	semaglutide	**-0.27**	**-0.34**	**-0.20**	4,013
lost over 5 lbs	semaglutide	**-0.55**	**-0.60**	**-0.51**	6,627