# Ozempic and Wegovy for Weight Loss, Pharmacological Component and Effect

Abdullah Mohammed Altywaiq[1], Turki Saud Naif Alanzi[2], Abdul Rahman Muhammad Al-Ruqi[3], Waleed Naif Alotaibi[4], Abdulrahman Abdullah I Alnughaythir[5], Shaluq Meshal Alshammari[6], Ibrahim Abdullahi Alnughaytir[7], Adel Mohammed I Alabdullatif[8], Sami Zaki Albaqami[9], Mohamed Madi S Alotaibi[10], Abdullah Mohammed Altywaiq[11], Fehaid Theeb Saad Alqahtani[12], Abdullah Bajad Al-Ameedi[13], Mohammed Khalid Alotaibi[14], Maher Khulaif Almutairi[15], Abdulaziz Jameel Saud Alotaibi[16], Saeed Saleh Alkhalifah[17], Mukhlid Mohammed Khalaf Alotaibi[18]

1. Abdullah Mohammed Altywaiq, Pharmacy Technician, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. aaltuwayq@moh.gov.sa
2. Turki Saud Naif Alanzi, Pharmacy Technician, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. Tusalanzi@moh.gov.sa
3. Abdul Rahman Muhammad Al-Ruqi, Pharmacist Assistant, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. b7mi.44@gmail.com
4. Waleed Naif Alotaibi, Pharmacist, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. Wanalotaibi@moh.gov.sa
5. Abdulrahman Abdullah I Alnughaythir, pharmacist, Shqra General hospital, Ministry of Health, Kingdom of Saudi Arabia. aaln@moh.gov.sa
6. Shaluq Meshal Alshammari, pharmacist, Shqra General Hospital, Ministry of Health, Kingdom of Saudi Arabia. shalshamry@moh.gov.sa
7. Ibrahim Abdullahi Alnughaytir, Pharmacist, Rafaya Al Gamsh Hospital, Ministry of Health, Kingdom of Saudi Arabia. Ialn@moh.gov.sa
8. Adel Mohammed I Alabdullatif, pharmacist, Shqra General hospital, Ministry of Health, Kingdom of Saudi Arabia. adalabdullatif@moh.gov.sa
9. Sami Zaki Albaqami, Pharmacy Technician, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. szalbaqami@moh.gov.sa

[10] Mohamed Madi S Alotaibi, Pharmacist Assistant, Shamiya Health Center, Ministry of Health, Kingdom of Saudi Arabia. momotaibi@moh.gov.sa
[11] Abdullah Mohammed Altywaiq, Pharmacy Technician, Al-Iman General Hospital, Ministry of Health, Kingdom of Saudi Arabia. aaltuwayq@moh.gov.sa
[12] Fehaid Theeb Saad Alqahtani, Technician pharmacy, Al- Muzahamiyah General Hospital, Ministry of Health, Kingdom of Saudi Arabia. faahd00@hotmail.com
[13] Abdullah Bajad Al-Ameedi, Pharmacy technician, Al Khafiya Health Center, Ministry of Health, Kingdom of Saudi Arabia. aalomide@moh.gov.sa
[14] Mohammed Khalid Alotaibi, Pharmacy Technician, Masal Health Center, Ministry of Health, Kingdom of Saudi Arabia. Mkalotiebi@moh.gov.sa
[15] Maher Khulaif Almutairi, Pharmacy Technicians, Shqra General Hospital, Ministry of Health, Kingdom of Saudi Arabia. Maherka@moh.gov.sa
[16] Abdulaziz Jameel Saud Alotaibi, pharmacist, Al-Bejadiyah General Hospital, Ministry of health, Kingdom of Saudi Arabia. A7.king7@hotmail.com
[17] Saeed Saleh Alkhalifah, Pharmacist Assistant, Directorate of health Affairs, Ministry of Health, Kingdom of Saudi Arabia. ssalkhalifa@moh.gov.sa
[18] Mukhlid Mohammed Khalaf Alotaibi, Pharmacy Technician, Alrafaya General Hospital, Ministry of Health, Kingdom of Saudi Arabia. makhlida@moh.gov.sa

**Abstract**:

In the USA, the obesity pandemic is becoming worse. The development of non-invasive pharmacotherapeutics to assist treat obesity is of tremendous interest because gaining weight is linked to an increased risk of developing life-threatening comorbidities, such as type 2 diabetes or hypertension. Numerous approaches have been used to control obesity, including dietary modifications, the use of appetite suppressants and thermogenic medications, and bariatric surgery for those who are extremely fat. Two of the five anti-obesity medications that have received FDA approval are Ozempic and Wegovy. These medications are intended to treat individuals with type 2 diabetes mellitus (T2DM). Researchers examined the weight loss effects of

T2DM therapies that have shown weight loss results in this study by assessing existing clinical studies for each agent in order to emphasize the beneficial effects of these medications as anti-obesity therapy. Numerous clinical investigations have demonstrated that whereas certain antihyperglycemic drugs induce weight gain or have neutral effects, others can aid in weight loss. A class of anti-diabetic drugs known as glucagon-like peptide-1 (GLP-1) receptor agonists has demonstrated promise in glycemic control and weight loss in individuals with or without type 2 diabetes.

**Keywords**

- Ozempic, Wegovy, Weight Loss, Effect, Pharmacology

**Introduction**

With approximately 40% of adults being overweight and 13% being obese, the prevalence of overweight and obesity—defined as having a body mass index (BMI) between 25.0–29.9 kg/m2 and ≥30.0 kg/m2—has nearly tripled globally during the 1970s and has been rising consistently. Comorbid conditions include hypertension, type 2 diabetes, hyperlipidemia, stroke, and even some malignancies are more common in obese patients. As a result, individuals with obesity are more likely to die from cardiovascular problems, which account for the majority of deaths in this population. The expense of fighting the obesity epidemic is another unfavorable effect; by 2030, it is projected to account for 16%–18% of all health spending in the United States (Singh et al., 2022).

In the United States, the first steps in an intervention for treating overweight and obesity involve making lifestyle alterations such as engaging in moderate to intense exercise, cutting back on calories, and receiving behavioral treatment. Although altering one's lifestyle can lower one's risk of cardiovascular problems, people find it difficult to maintain weight loss they have achieved. When lifestyle adjustments fail to provide noticeable results, using pharmacotherapeutics could aid in weight loss (Isaacs et al., 2016).

Numerous chronic diseases, including Type 2 diabetes mellitus (T2DM), cancers of the bladder, colon, kidney, liver, endometrial, and breast, hyperlipidemia, hypertension, coronary heart disease, stroke, osteoarthritis, and respiratory conditions like sleep apnea have all been demonstrated to be closely associated with being overweight. Risk factors also

increase for obese youngsters who maintain this condition until adulthood (Jeong & Priefer, 2022).

It has been demonstrated that obese patients can benefit significantly from even modest weight loss in terms of their health. A patient's risk of type 2 diabetes is decreased by 30–60% if they lose 2.5–5% of their body weight and keep it off for two years. A 5–10% weight decrease also considerably reduces the risk of cardiovascular disease. As a result, several recommendations call for a minimum weight loss threshold of 10%. Anti-obesity medications have gained approval in recent years for extended usage, improving the management of some diseases. Many of these, when paired with lifestyle changes, can result in a 5–10% reduction in weight (Jeong & Priefer, 2022).

While food and exercise are the cornerstones of lifestyle intervention for weight management, maintaining weight loss over an extended period of time can be difficult. Adjunctive medication is recommended by clinical guidelines, especially for people with a body-mass index (BMI) of 30 or higher, or 27 or higher in those with comorbid illnesses. The BMI is calculated by dividing a person's weight in kilograms by their height in meters. However, low efficacy, safety issues, and expense continue to restrict the usage of currently available treatments (Wilding et al., 2021).

Wegovy (Semaglutide) is an analogue of glucagon-like peptide-1 (GLP-1) that is approved for the treatment of type 2 diabetes in adults. It can be administered subcutaneously once a week at doses up to 1 mg, and it can lower the risk of cardiovascular events in people who already have cardiovascular disease and type 2 diabetes. Individuals with type 2 diabetes and adults with obesity who took part in a phase 2 trial had weight loss due to semaglutide; these results encouraged additional research. The goal of the worldwide phase 3 Semaglutide Treatment Effect in People with Obesity (STEP) study is to assess the safety and effectiveness of semaglutide given subcutaneously once a week at a dose of 2.4 mg in individuals who are overweight or obese, regardless of the presence or absence of weight-related comorbidities (Wilding et al., 2021). Based on comparable standards, semaglutide, an injectable given once a week to treat obesity, would be recommended. It has produced weight loss comparable to that of bariatric surgery. Sequaglitide has a similar safety profile of other GLP-1 RAs, with gastrointestinal problems being prevalent. If weight loss is the goal, the patient should have monthly safety and efficacy checks. Semaglutide is a promising new agent in the

class of anti-obesity medications overall, with insurance coverage posing the biggest obstacle (Phillips & Clements, 2021).

Social media and celebrity influence have made the off-label usage of Ozempic, the brand name for the GLP-1 agonist semaglutide, for cosmetic weight loss more common. Recently, the FDA approved glucagon-like peptide 1 (GLP-1) agonists, a family of medications used to treat diabetes, for the medical management of obesity (Han et al., 2023).

**Aim of the study**

To detect the effect of Ozempic and Wegovy in Weight Loss by reducing their body weight and improving their overall health.

**Significance of the study**

The study aimed to detect the effect of Ozempic and Wegovy in Weight Loss by reducing their body weight and improving their overall health. To detect the effect of Ozempic and Wegovy in Weight Loss by reducing their body weight and improving their overall health.

**Objectives**

[1] Searching the pharmacological component of Ozempic and Wegovy.

[2] Study the effect of Ozempic and Wegovy for Weight Loss.

**Methodology**

Ozempic, Wegovy, Weight Loss, Effect, Pharmacology

The related studies were found using a systematic search in PubMed, Google Scholar, Embase, the Cochrane library, and Web of Science. The following search string combinations were used: (“Ozempic and Wegovy, ”) AND (“Weight Loss and Effect and Pharmacology”).

Giving examples from the research field rather than conducting a systematic evaluation of the many publications in this discipline. Searches of reference libraries, PubMed, Google, and reference lists provided in prior reviews and commentaries led to studies discussing Ozempic and Wegovy for Weight Loss, pharmacological component and effect.

**Literature review**

The close relationship between the two epidemics of obesity and diabetes is encapsulated by the term "diabesity." A multifactorial metabolic syndrome, obesity increases the risk of various diseases that can impair quality of life and cause

death, such as type 2 diabetes, cardiometabolic disorders, dementia, depression, and cancers. Global obesity prevalence has surged to pandemic proportions in the last fifty years. Obesity control measures include included medication (such as appetite suppressants and thermogenic agents), bariatric surgery for individuals who are exceedingly obese, and changes in lifestyle habits, such as techniques to enhance food and exercise quality (Haddad et al., 2023).

An increasing number of medications designed to aid in weight loss have been produced as the prevalence of obesity rises. While several weight-loss medications were approved, many of them were also discontinued due to safety and efficacy issues. The first methods used in the development of weight reduction medications were appetite suppression and an increase in physiological energy expenditure. Since then, medications that target recently identified receptors and/or enzymes have been released with better safety profiles and fewer psychological adverse events as more physiological reasons for weight gain have been identified.

Furthermore, medications that block satiety or hunger signals have been thoroughly researched and are becoming more widely used by doctors. Drugs that target metabolic tissues, such as muscle or adipose tissue, have also been studied in relation to weight loss; however, none of these studies have resulted in clinical practice to date. Firstly, a quick overview of the early therapies for obesity (Jeong & Priefer, 2022).

The majority of guidelines suggest pharmacotherapy only as an addition to lifestyle adjustments, such as diet and exercise, as the primary approach to weight management. Since obesity is a chronic disease, the three most important characteristics of an ideal pharmacotherapy treatment are that it should produce clinically significant weight loss, that its benefits should balance its hazards, and that it should be affordable over the long term. Anti-obesity medications use several modes of action (MOA). Diet suppressants, or appetite suppression, can lower calorie intake due to neuropsychiatric modulation. Patients who experience delayed stomach emptying may feel fuller for longer and eat less as a result (increased satiety). Some medications can speed up metabolism, which causes weight loss by increasing energy expenditure. On the other hand, absorption modulators, which reduce the absorption of lipids or carbs, can reduce total caloric intake. Lastly, a recently created strategy focuses on reducing the creation of fat and adipose tissue. A summary of the five distinct mechanisms of action (MOAs) of anti-obesity

medications is provided below, along with the clinical results that go along with them. These are: (1) diet suppressants; (2) increased satiety and decreased food reward; (3) increased metabolism; (4) absorption modulators; and (5) increased energy expenditure (Jeong & Priefer, 2022).

**Wegovy**

Glucagon-like peptide-1 (GLP-1) receptor agonists include prescription drugs such as semaglutide, which is marketed under the brand name Wegovy. One brand name for semaglutide that you might be acquainted with is Ozempic; it has been used recently to treat type II diabetes and weight reduction. Wegovy is primarily used to help manage weight. It is intended to be an injection once a week rather than daily. On the other hand, it also helps most people's lipid profiles and blood sugar levels (Sarah Zimmer & Russin, 2024).

By binding to GLP-1 receptors in the brain, wegovy decreases overall food intake and increases feelings of fullness. On the other hand, Wegovy's sustained-release drug provides the weekly injection convenience, which may improve compliance with the recommended weight loss regimen. Clinical trials have shown it to be highly effective in causing significant weight loss, and as such, it is typically advised for obese or overweight people who also have weight-related medical issues. Wegovy works best when combined with other comprehensive weight-loss strategies like dietary adjustments and increased exercise. Reducing stress, increasing resistance exercise, and eating high-fiber breakfasts like oatmeal are all beneficial lifestyle choices that can enhance the effects of medications like Wegovy for weight loss (Sarah Zimmer & Russin, 2024).

**Pharmacology**

Semaglutide, a "GLP-1 receptor agonist" that binds to the Glucagon-like peptide-1 receptor, is the active ingredient in Wegovy. It functions similarly to the body's natural hormone GLP-1 and seems to control appetite by making people feel fuller after eating less and decreasing their desire for and consumption of food. FDA-approved GLP-1RA drugs are used to treat obesity and other metabolic diseases like diabetes, not merely the latest weight loss trend. Semaglutide, the particular drug in Novo Nordisk's Ozempic, functions similarly to other GLP-1Ras by imitating a hormone that aids in blood sugar regulation, reduces hunger, and delays the process of stomach emptying. Some people may see weight loss as a result of these combined results. Based on clinical research, GLP-1RA has

been shown to cause considerable weight loss of up to 10-15%, and it is approved to treat obesity and type 2 diabetes (Lynne H. Slim, 2024).

Semaglutide comes in a prefilled, single-dose pen with an integrated needle under the brand name Wegovy (Novo Nordisk). Once administered, the prefilled pen can be thrown away in the garbage. The pen comes in five strengths (0.25, 0.5, 1.0, 1.7, and 2.4 mg), and each box contains four pens, enough for a month's supply. Semaglutide at a dose of 2.4 mg is authorized for the treatment of obesity; a monthly titration is suggested to enhance tolerance and reduce gastrointestinal side effects. Although the effectiveness of a prolonged semaglutide titration is unknown, it might be appropriate in clinical practice for patients who have unacceptable gastrointestinal side effects (Phillips & Clements, 2021).

The manufacturer offers precise guidelines regarding missing semaglutide doses and the interval between doses (e.g., less than or more than 2 days). If more than two consecutive doses of semaglutide are missed, the medication may be reintroduced at the patient's regular administration schedule or at 0.25 mg once weekly to reduce gastrointestinal unpleasant effects. Every week, semaglutide can be injected under the skin of the thigh, upper arm, or belly. As a GLP-1 RA, the general mechanism of the therapeutic class may have some effect on the absorption of oral drugs due to stomach emptying. The addition of semaglutide to an insulin or sulfonylurea therapy regimen should be done with caution in individuals with T2D who are obese because of the possibility of hypoglycemia. Insulin or sulfonylurea medication should be lowered or stopped if hypoglycemia occurs (Phillips & Clements, 2021).

Therapeutic indications, administration, and dose-escalation

Once-weekly injectable semaglutide 2.4 mg (marketed under the brand name "Wegovy") is recommended for adult patients with a BMI of 30 kg/m2 or higher who also have at least one obesity-related comorbidity, such as dyslipidemia, hypertension, or type 2 diabetes, in addition to a diet low in calories and increased physical activity. The course of treatment consists of a weekly subcutaneous injection that should be given on the same day, whether or not meals are consumed. Without adjusting the dosage, the injection site and time can be modified. Doses of 0.25, 0.5, 1.0, 1.7, or 2.4 mg of subcutaneous semaglutide for weight management are available in the USA. Starting the treatment at 0.25 mg once weekly for 4 weeks is the recommended starting dose. After

that, the dose should be increased every 4 weeks until the maintenance dose of 2.4 mg is attained. Patients may postpone further escalation for up to four weeks if they are unable to tolerate a dose during the dose titration (Lau et al., 2022).

**Pharmacokinetics**

The pharmacokinetic profile relating to the absorption, distribution, metabolism, and elimination of subcutaneously administered once-weekly semaglutide (wegovy) is summarized

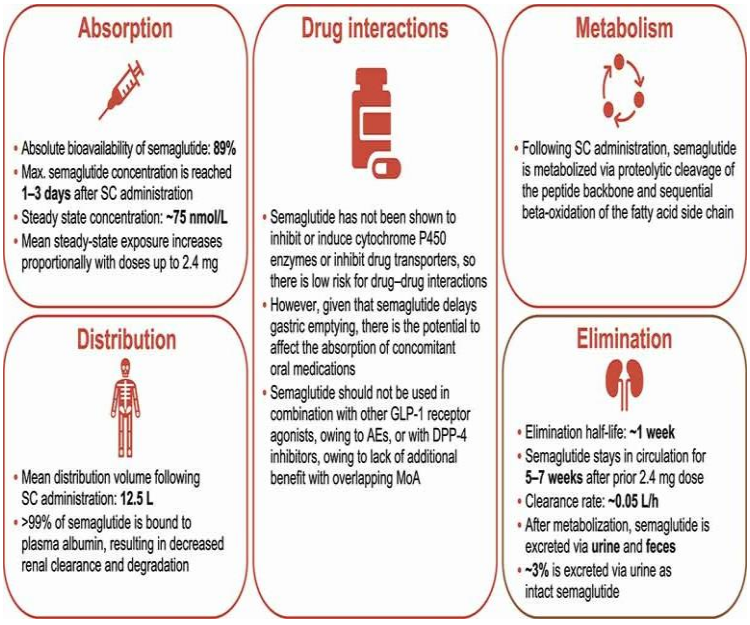


Figure 1. Pharmacokinetic properties of once-weekly subcutaneous semaglutide 2.4 mg treatment in patients with overweight and obesity (Lau et al., 2022).

**Wegovy effect**

Clinical investigations using Wegovy 2.4 mg have shown that the medication is linked to a significant and long-lasting reduction in body weight. Following 68 weeks of treatment, the average weight loss in these trials was 15.8%. Wegovy mimics the effect of a gut hormone called GLP-1 to reduce hunger, resulting in this notable and long-lasting weight loss. This hormone prolongs feelings of fullness by slowing the passage of food through the stomach (Andrew Le, 2024).

Wegovy users have varying degrees of weight reduction based on their unique circumstances, how long they take their prescription, and how supportive they are. People using the maximal dose of Wegovy lost 12% more body weight than people not taking the medicine in a significant study (STEP 1 clinical trial). But it's important to remember that long-term weight loss may necessitate continuing dietary and lifestyle

adjustments because stopping Wegovy has been linked to weight gain (Andrew Le, 2024).

**Side effects**

1) Digestive Distress: Individuals may feel queasy, vomit, have diarrhea, be constipated, or have pain in their abdomens. Smaller meals spaced out throughout the day and adequate hydration can also help to lessen these symptoms, which often become better with time as the body gets used to the medicine.
2) Elevated Heart Rate: Although usually not severe, people with a history of cardiovascular disease should speak with their doctors.
3) Fatigue: this could indicate hypoglycemia or not. Since GLP-1 type medications aim to lower blood sugar, you may experience hypoglycemia during a specific dosage or period of time.
4) Lightheadedness and Headaches
5) Changes in Thyroid Function: People who already have thyroid issues may need to have their thyroid medication monitored and adjusted (Sarah Zimmer & Russin, 2024).
Based on the effectiveness of randomized, placebo-controlled trials, particularly the bigger response or weight reduction from the clinical trials, the overall clinical implications of semaglutide appear encouraging. Semaglutide has a larger weight loss response from baseline than other anti-obesity medications, and it may be similar to some bariatric surgery techniques. Semaglutide has limitations for some patient populations, such as pregnant women or those with a personal or family history of medullary thyroid cancer, despite being the first anti-obesity medication since 2014. As with other GLP-1 RA, patients with gastroparesis should exercise caution while contemplating semaglutide. Semaglutide should not be used in people with a history of acute pancreatitis, and it should be stopped if a patient experiences acute pancreatitis after starting it (Phillips & Clements, 2021).

**Ozempic**

Ozempic is a member of the group of drugs called agonists of glucagon-like peptide 1 (GLP-1). Because GLP-1 agonists increase the satiating effects of the naturally occurring GLP-1 hormone and inhibit glucagon release, they are most frequently used to treat obesity and type 2 diabetes (T2DM). Semaglutide (Ozempic and Wegovy; Novo Nordisk), tirzepatide (Mounjaro; Eli Lilly and Company, Indianapolis, IN), liraglutide,

exenatide, and numerous more medications are included in this class of drugs (Han et al., 2023).

Wegovy is an FDA-licensed medication for managing obesity-related weight loss in patients, however Ozempic, a "sister" semaglutide, is only approved by the FDA for treating type 2 diabetes. However, social media and other media platforms have been promoting and even glorifying the off-label use of Ozempic for cosmetic weight loss. Wegovy and Ozempic shortages have persisted because to the drug's growing popularity and interest, which has an effect on patients who need these drugs to control their type 2 diabetes. Terms like "Olympic parties" and "Olympic face" have proliferated in the media, and a growing number of patients are seeking advice and treatment from aesthetic physicians (Han et al., 2023).

**Ozempic effect**

While Ozempic can aid in weight loss, it seems to have a less significant effect than Wegovy. Adults starting treatment with an average starting weight of 197 pounds and taking 1.0 mg semaglutide per week experienced an average weight decrease of 6% after a year of Ozempic therapy.

Ozempic functions by simulating a hormone that is present in the body and informing the brain when a person is satisfied. Moreover, it slows digestion in a way that is comparable to bariatric surgery.

Although semaglutide, the active ingredient in Ozempic, is licensed for weight loss under the brand name Wegovy, the medication itself is not expressly approved for weight loss. People who use Ozempic to lose weight should be aware that the medicine may cause their bodies to adjust, which could result in weight plateaus.

Ozempic may cause weight gain, according to research, underscoring the significance of ongoing lifestyle modifications like a healthy diet and regular exercise for long-term weight control (Andrew Le, 2024).


Figure 2. Ozempic can promote weight loss (Andrew Le, 2024).

**Ozempic side effects**

Ozempic side effects can range from minor to severe. Some of the most common adverse effects of using Ozempic are listed in the list below. There are more potential adverse effects than those on this list.

Consult your physician or pharmacist for more details on Ozempic's potential adverse effects or advice on how to handle a concerning side effect. For additional information regarding Ozempic's possible adverse effects, see this article.

The more common side effects of Ozempic can include:

1) nausea
2) headache
3) vomiting
4) diarrhea
5) stomach pain
6) upset stomach
7) constipation
8) flatulence (passing gas) (Nguyen, PharmD, 2022)

Wegovy and Ozempic use during pregnancy

No, taking semaglutide-containing medications like Wegovy and Ozempic while pregnant is not advised. The Food and Drug Administration of the United States has issued a warning regarding the potential hazards that these drugs may present to the fetus, including low birth weight, birth abnormalities, and miscarriage. It is recommended that if you are pregnant or want to become pregnant, you avoid certain drugs, even if the majority of the evidence is derived from small animal studies (Andrew Le, 2024).

**Conclusion**

GLP-1 agonists, such semaglutide (Ozempic and Wegovy), have been incredibly popular in the last few years. The surge in popularity can be ascribed to the accomplishments exhibited by clinical studies and the frequency of conversations about it on social media. To the best of our knowledge, prior research has not compared and contrasted additional GLP-1 agonists, various medication delivery methods (oral and injectable), and dosage ranges with an emphasis on their off-label use and the outcomes of the most current clinical trials. Prior to prescription a GLP-1 agonist, healthcare providers should ensure that they have taken into account the individual history, needs, and goals of each patient. Along with GLP-1 agonists, a variety of diagnostic techniques and treatment alternatives are available. It is also important to continue researching the effectiveness of various medication combinations and lifestyle modifications. It is important to keep in mind that rather than using GLP-1 agonists for a purpose that is actually medically necessary, many people—including some celebrities—are interested in using them for aesthetic or cosmetic weight loss. In order to create recommendations for precision medicine, future research should examine the varying effects of GLP-1 agonists in various demographics, in people with various lifestyle patterns, and in long-term efficacy data.

In addition to being more effective in lowering body weight than other antidiabetic medications, wegovy (semaglutide) also has cardioprotective properties. The ability to take semaglutide for long-term weight management is another important advantage. Wegovy's latest approval suggests that patients' quality of life and outcomes connected to weight loss should improve.

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