

ORIGINAL ARTICLE

GLP-1 Therapies as Essential Medicines: Opportunities and Barriers for Diabetes Care

Sachin C Narwadiya¹, Neha Suthar²**HOW TO CITE THIS ARTICLE:**

Sachin C Narwadiya, Neha Suthar. GLP-1 Therapies as Essential Medicines: Opportunities and Barriers for Diabetes Care. RFP Jour. of Bio. and Biophy. 2026; 11(1): 07-12.

ABSTRACT

GLP-1 is a natural hormone that helps control blood sugar and hunger. It is released when you eat and helps the body release insulin, slows down how fast food leaves the stomach, and stops the body from making too much glucagon. These actions all help keep blood sugar levels lower. Some medicines called GLP-1 receptor agonists act like this hormone to treat type 2 diabetes and obesity by helping control blood sugar and helping people lose weight. The enzyme dipeptidyl peptidase IV can break down and stop GLP-1 from working before it leaves the gut. This shows that GLP-1 may also affect the body through nerves found in the gut and the liver, which have GLP-1 receptors. GLP-1 and its receptors are being tested to help manage type 2 diabetes. Lower levels of GLP-1 may be linked to obesity, while too much GLP-1 can cause low blood sugar after eating. This study looked at how these new diabetes medicines work in the Indian context by reviewing case studies. The results are promising and offer new hope for diabetes treatment.

KEYWORDS

- GLP-1 Receptor Agonists • Type 2 Diabetes Mellitus • Obesity Management
- Cardiometabolic Risk • Public Health Policy

AUTHOR'S AFFILIATION:

¹Scientist D, Institute of Advance Study in Science and Technology, Guwahati and Research Scholar, School of Public Health, Poornima University, Jaipur, Rajasthan, India.

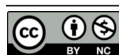
²Tutor, Dr. M K Shah Medical College and Research Centre, Ahmedabad, Gujarat, India.

CORRESPONDING AUTHOR:

Sachin C Narwadiya, Scientist D, Institute of Advance Study in Science and Technology, Guwahati and Research Scholar, School of Public Health, Poornima University, Jaipur, Rajasthan, India.

E-mail: snarwadiya@gmail.com

➤ Received: 16-01-2026 ➤ Accepted: 19-02-2026



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution NonCommercial 4.0 License (<http://www.creativecommons.org/licenses/by-nc/4.0/>) which permits non-Commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the Red Flower Publication and Open Access pages (<https://www.rfppl.co.in>)

INTRODUCTION

Glucagon-like peptide-1 (GLP-1) receptor agonists are a type of medicine used mainly to treat type 2 diabetes and, recently, obesity. These medicines act like the natural GLP-1 hormone made by cells in the gut after eating. This helps lower blood sugar and control appetite. After the first GLP-1 medicine, exenatide, was approved in 2005, more of these medicines have come out with different structures, how long they work, and how often you take them.¹

These medicines work in several ways.

It can help the pancreas release insulin when blood sugar is high, stop the pancreas from releasing too much glucagon, slow how fast food leaves the stomach, and make you feel full, which helps control eating. Because these medicines only help release insulin when glucose is high, they are less likely to cause low blood sugar if taken alone. All these actions help control blood sugar levels, lower blood sugar spikes after eating, and help people lose weight.²

Several GLP-1 medicines are currently used, including dulaglutide, exenatide (both immediate and extended release), liraglutide, lixisenatide, and semaglutide, which is also available in pill form. A newer medicine called tirzepatide works on both GLP-1 and another hormone, GIP, and may have better effects on metabolism. These medicines can be taken daily or once a week, making it easier for people to stick to their treatment.³

For type 2 diabetes, these medicines are often used if other treatments like metformin aren't enough, can't be used, or aren't tolerated well. They are often used with other medicines as part of a broader treatment plan that includes lifestyle changes like diet and exercise. Important studies have shown that some of these medicines also help protect the heart and kidneys, reducing heart problems and slowing kidney disease.⁴

Although GLP-1 medicines aren't approved for type 1 diabetes, some research suggests they may help in certain cases by lowering blood sugar and body weight. But they aren't approved for use in type 1 diabetes and are usually used off-label, requiring careful use by doctors.⁵

In treating obesity, GLP-1 medicines are a big step forward. High doses of liraglutide

and semaglutide have shown significant and lasting weight loss in people with obesity or overweight who have other health issues. These effects are mostly from making people feel full and reducing their appetite, which leads to eating less. Since obesity is a complex condition, the best results come from combining medicines with changes in diet, exercise, and behavior.⁶

Obesity is one of the biggest public health problems globally, affecting over one billion people and linked to about 3.7 million deaths in 2024. It is a major factor in non-communicable diseases like heart disease, type 2 diabetes, and some cancers, and it can make infections worse. If action isn't taken, obesity rates are expected to double by 2030, and the cost could reach \$3 trillion a year.⁷

In response to this growing issue, the World Health Organization (WHO) released its first guidelines on using GLP-1 medicines to treat obesity. This officially recognizes obesity as a long-term, recurring condition that needs ongoing care. This change in policy means that taking these medicines as part of a treatment plan is now accepted globally. This guideline follows WHO's earlier decision to include GLP-1 medicines in the list of essential medicines for managing type 2 diabetes in high-risk groups.⁸

Research Methodology: This study used a narrative review with systematic elements to look at the current evidence on the use of GLP-1 receptor agonists in treating type 2 diabetes and obesity, with a focus on global guidelines and the situation in India. A detailed search was done across several databases like PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, and the Cochrane Library. We also looked at key policy documents and guidelines from the World Health Organization (WHO), Indian Council of Medical Research (ICMR), American Diabetes Association (ADA), and European Association for the Study of Diabetes (EASD). The search included terms like "GLP-1 receptor agonists," "type 2 diabetes," "obesity," "semaglutide," "liraglutide," "tirzepatide," "cardiovascular outcomes," and "India."

We included studies that were peer-reviewed articles, randomized controlled trials, systematic reviews, meta-analyses, real-world evidence studies, or authoritative guidelines in English that involved adults. We excluded studies that only used animals,

studied children, were editorials, or didn't have good research methods.⁹

Relevant articles were screened through title and abstract review followed by full-text assessment. Data were extracted using a standardized framework capturing study design, population characteristics, GLP-1 agent used, clinical outcomes (HbA1c reduction, weight loss, cardiovascular and renal effects), and safety profiles. Methodological quality was appraised using established tools such as the Cochrane Risk of Bias framework and AMSTAR, where applicable.¹⁰

Findings were synthesized thematically, focusing on mechanisms of action, clinical efficacy, safety, cardiometabolic benefits, and policy implications. Given the heterogeneity of study designs, a qualitative synthesis approach was adopted. As the review relied exclusively on published literature, ethical approval was not required.¹¹

Relevant articles were first checked by looking at titles and abstracts, and then full texts were reviewed. Data were collected using a standard method that included information about the study design, the people involved, the GLP-1 medicine used, clinical results like HbA1c reduction, weight loss, and effects on the heart and kidneys, as well as safety issues. The quality of the studies was checked using established tools like the Cochrane Risk of Bias tool and AMSTAR when needed.¹²

The results were grouped based on themes such as how the medicines work, their effectiveness, safety, heart and metabolism benefits, and what policies should be considered.

Because the studies were different in design, a qualitative approach was used to combine the findings. Since the review used only published articles, it didn't need ethical approval.¹³

RESULTS AND INTERPRETATIONS

Table 1: Case Studies Demonstrating Differential Impact of GLP-1 Receptor Agonists

| Case Type | Patient Profile | GLP-1 Agent & Duration | Primary Outcome | Secondary Effects | Interpretation / Impact (Ref No.) |
|-------------------------------------|-----------------------------------------------------------------|-------------------------------------|------------------------|-----------------------------------------|-----------------------------------------------------|
| Positive – Metabolic & CV Benefit | 52-year-old male, T2DM, BMI 33 kg/m ² , hypertension | Semaglutide 1 mg weekly, 52 weeks | HbA1c ↓ 8.9% → 6.7% | Weight ↓ 11 kg; BP ↓; lipid improvement | Robust cardiometabolic benefit ^{14,20} |
| Positive – Obesity without Diabetes | 41-year-old female, BMI 38 kg/m ² | Liraglutide 3 mg daily, 56 weeks | Weight ↓ 14% | Improved mobility, quality of life | Effective obesity pharmacotherapy ¹⁵ |
| Positive – Renal Protection | 60-year-old male, T2DM, CKD stage 3a | Dulaglutide 1.5 mg weekly, 72 weeks | Stable eGFR | Reduced albuminuria | Renoprotective effect ¹⁶ |
| Negative – GI Intolerance | 45-year-old female, T2DM | Exenatide BID, 12 weeks | Treatment discontinued | Nausea, vomiting | Tolerability limitation ^{17,19} |
| Negative – Retinopathy Progression | 58-year-old male, long-standing T2DM, retinopathy | Semaglutide, 24 weeks | Rapid HbA1c reduction | Worsened retinopathy | Microvascular risk with rapid control ¹⁸ |
| Negative – Acute Pancreatitis | 50-year-old female, obesity, gallstones | Liraglutide, 6 months | Hospitalization | Pancreatitis | Rare serious adverse event ^{19,20} |
| Neutral – Modest Glycaemic Effect | 47-year-old male, early T2DM | Lixisenatide, 24 weeks | HbA1c ↓ 0.4% | Minimal weight change | Limited incremental benefit ²⁰ |
| Neutral – Weight Loss Plateau | 55-year-old female, obesity | Semaglutide, 1 year | Weight ↓ 4% | No lifestyle modification | Behavioural support needed ^{14,20} |
| Neutral – Elderly Patient | 72-year-old male, T2DM, frailty | Dulaglutide, 36 weeks | Stable HbA1c | Mild nausea | Cautious use in elderly ^{16,19} |

Table 2: Use of GLP-1 Receptor Agonists in Type 2 Diabetes: Indian Context

| Study / Setting | Population (India) | GLP-1 Agent | Key Findings | Clinical Interpretation | Ref No. |
|------------------------------|-----------------------------|----------------------|--------------------------------------------|------------------------------------------------------|---------|
| Real-world combo therapy | Overweight/obese T2D (n=95) | Dulaglutide + SGLT2i | ↓ HbA1c, ↓ weight, ↓ BP, lipid improvement | Effective metabolic control with combination therapy | 22 |
| Observational cohort | Obese T2D (n=196) | Liraglutide | Improved glycaemia and weight loss | Safe and effective in Indian clinical practice | 23 |
| Prospective real-world study | T2D (n=195) | Liraglutide add-on | ↓ HbA1c, ↓ weight, ↓ BP, ↓ cholesterol | Multi-parameter cardiometabolic benefit | 24 |
| Long-term follow-up | Obese T2D (1-year) | Liraglutide | Sustained HbA1c and weight reduction | Long-term benefit with variable response | 25 |
| Pioneer Real India | T2D (n=388) | Oral Semaglutide | HbA1c ↓ ~1.8%, weight ↓ ~7 kg | Effective oral GLP-1 option for Indian patients | 26 |

Outcomes in the Indian context:

Positive metabolic effects: GLP-1 receptor agonists like dulaglutide, liraglutide, and oral semaglutide consistently help improve blood sugar control and reduce weight among Indian patients with type 2 diabetes.

Cardiometabolic benefits: These medicines also help improve blood pressure, cholesterol levels, and the need for other medications, especially when used with other treatments.

Real-world effectiveness: Observational studies show how these medicines are used in Indian hospitals and communities, with good safety and effectiveness when used with existing treatments.

Sustained outcomes: Using these medicines for up to a year shows continued improvement in blood sugar and weight, though responses can vary between individuals.

Oral formulation acceptance: Oral semaglutide works similarly to injected versions in Indian practice, with good results in controlling blood sugar and weight and good stomach tolerance.

DISCUSSION

The WHO gives conditional recommendations for using GLP-1 therapies in adults with obesity, but not for pregnant women.

Although strong evidence shows these medicines help with weight loss and improve metabolic health, the recommendations are conditional because of concerns about long-term safety, how long the benefits last after stopping, high costs, the readiness of health systems, and health inequalities. The WHO also suggests combining GLP-1 therapies with

intensive behavioural changes like structured diet and exercise programs to keep results long-term.⁷

Importantly, WHO says GLP-1 therapies alone won't solve the global obesity problem. Obesity is seen as a societal issue caused by many factors like environment, behaviour, and economy, which needs actions from different sectors. WHO recommends a three-part approach: creating better environments through policies, protecting high-risk people through early detection and help, and providing long-term, personalized care for obesity. Equitable access to GLP-1 treatments is a big challenge.⁸

Without proper policies, these medicines might increase health inequality, especially in poorer countries. Even with more production, fewer than 10% of people who could benefit from GLP-1 therapies are expected to get them by 2030. Solutions suggested include buying in bulk, tiered pricing, free licensing, and better preparation of health systems. The fast growth in demand for GLP-1 medicines has also raised worries about fake or poor-quality products.⁹

WHO says it's important to have strict manufacturing and distribution rules, doctors prescribing these medicines, strong safety monitoring, and patient education, backed by international efforts to protect patients and public trust. Overall, GLP-1 receptor agonists are changing how we treat type 2 diabetes and obesity. Their use in clinics and in global health policies shows the shift towards seeing obesity as a long-term disease that needs ongoing care. Continuing research, making these medicines available to more people, and tracking long-term safety will be key to maximizing their health benefits.¹⁰

CONCLUSION

GLP-1 receptor agonists have become a big advance in treating type 2 diabetes and obesity. They offer benefits beyond just controlling blood sugar, including safe weight loss and reduced risk for heart and kidney problems. The growing evidence shows that these medicines address important issues in metabolic diseases like insulin issues, appetite control, and heart-related risks.

New policies, especially the WHO's conditional recommendations and including GLP-1 treatments in the essential medicines list for high-risk groups, mark a big step in seeing obesity as a long-term condition needing ongoing care. However, the WHO also highlights concerns about long-term safety, how long the weight loss lasts, cost, and health system readiness, especially in countries like India.

In India, GLP-1 receptor agonists have a lot of potential given the high rates of diabetes and obesity and the high risks related to heart and metabolism even at lower weights. But widespread use is limited by cost, access, and the need for education for both doctors and patients. It's important to remember that medicine alone can't fix the obesity and diabetes problems. Best results come from combining GLP-1 treatments with lifestyle changes, behavioural support, and long-term care.

Future studies should focus on real-world effectiveness, safety, and cost savings.

Also, new policies are needed to improve access. When used properly and supported by strong health systems, GLP-1 receptor agonists can make a big difference in fighting the growing health problems of obesity and diabetes.

REFERENCES

1. World Health Organization. WHO guideline on the use of glucagon-like peptide-1 (GLP-1) therapies for the treatment of obesity in adults. WHO; 2025.
2. Drucker DJ. The biology of incretin hormones. *Cell Metab*. 2016.
3. Frias JP, et al. Tirzepatide versus semaglutide once weekly in patients with type 2 diabetes. *N Engl J Med*. 2021.
4. Marso SP, et al. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2016.
5. Mathieu C, et al. GLP-1 receptor agonists in type 1 diabetes: A review. *Diabetes Care*. 2020.
6. Wilding JPH, et al. Once-weekly semaglutide in adults with overweight or obesity. *N Engl J Med*. 2021.
7. World Health Organization. Obesity and overweight: Fact sheet. WHO; 2025.
8. World Health Organization. Obesity as a major risk factor for noncommunicable diseases. WHO; 2025.
9. World Health Organization. Global economic impact of obesity. WHO; 2025.
10. World Health Organization. WHO issues global guideline on GLP-1 medicines for obesity. WHO; 2025.
11. World Health Organization. WHO model list of essential medicines: 2025 update. WHO; 2025.
12. World Health Organization. WHO acceleration plan to stop obesity. WHO; 2025.
13. World Health Organization. Falsified and substandard medical products: Public health implications. WHO; 2025.
14. Marso SP, Daniels GH, Brown-Frandsen K, et al. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2016;375(4):311-322.
15. Wilding JPH, Batterham RL, Calanna S, et al. Once-weekly semaglutide in adults with overweight or obesity. *N Engl J Med*. 2021;384(11):989-1002.
16. Gerstein HC, Colhoun HM, Dagenais GR, et al. Dulaglutide and cardiovascular outcomes in type 2 diabetes (REWIND). *Lancet*. 2019;394(10193):121-130.
17. Buse JB, Nauck M, Forst T, et al. Exenatide once daily versus twice daily in patients with type 2 diabetes. *Diabetes Care*. 2011;34(2):282-288.
18. Marso SP, Bain SC, Consoli A, et al. Semaglutide and cardiovascular outcomes in patients with type 2 diabetes (SUSTAIN-6). *N Engl J Med*. 2016;375(19):1834-1844.
19. Nauck MA, Meier JJ. Incretin therapies: Highlighting common features and differences in the modes of action. *Diabetes Obes Metab*. 2019;21(Suppl 1):21-35.
20. Drucker DJ. Mechanisms of action and therapeutic application of GLP-1. *Cell Metab*. 2018;27(4):740-756.
21. Anjana, R. M., Pradeepa, R., Deepa, M., Datta, M., Sudha, V., Unnikrishnan, R., & Mohan, V. (2017). Prevalence of diabetes and prediabetes in urban and rural India: Phase I results of the Indian Council of Medical Research-India

- Diabetes (ICMR-INDIAB) study. *Diabetologia*, 60(5), 852–860. <https://doi.org/10.1007/s00125-017-4276-2>.
22. Kalra, S., Gupta, Y., & Baruah, M. P. (2016). GLP-1 receptor agonists in the management of type 2 diabetes mellitus: An Indian perspective. *Indian Journal of Endocrinology and Metabolism*, 20(5), 707–715. <https://doi.org/10.4103/2230-8210.190538>.
 23. Mohan, V., Unnikrishnan, R., Shobana, R., & Anjana, R. M. (2019). Pharmacologic management of type 2 diabetes in India: Current status and future directions. *The Journal of the Association of Physicians of India*, 67(Suppl 3), 11–18.
 24. Gupta, Y., Kalra, S., Baruah, M. P., & Singla, R. (2018). Weight-centric management of type 2 diabetes: Role of GLP-1 receptor agonists in Asian Indians. *Diabetes Therapy*, 9(4), 1351–1362. <https://doi.org/10.1007/s13300-018-0453-1>.
 25. Indian Council of Medical Research. (2018). ICMR guidelines for management of type 2 diabetes mellitus. New Delhi, India: ICMR. Retrieved from <https://www.icmr.gov.in>
 26. Real-World Usage of Once-Daily Oral Semaglutide in Adults with Type 2 Diabetes: Findings from Pioneer Real India, *Indian Journal of Endocrinology and Metabolism*, 2025. PMID: 41229720.