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Review Article

Pharmacological, behavioral, and sociocultural dimensions of GLP-1 and dual incretin therapies in Saudi Arabia: clinical evidence, misuse patterns, and policy priorities

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ABSTRACT

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and dual incretin therapies, including semaglutide and tirzepatide, have reshaped the management of obesity and type 2 diabetes. Their rapid uptake in Saudi Arabia has created both opportunities and challenges, notably the rise in cosmetic-driven use, socioeconomic disparities, and emerging regulatory concerns. This narrative review synthesizes clinical, mechanistic, sociocultural, and policy-related evidence on GLP-1 and dual incretin therapies in Saudi Arabia, with a particular focus on real-world use patterns, misuse, and implications for Vision 2030 health goals. Evidence was drawn from randomized clinical trials, observational studies, national reports, and Gulf-region literature published between 2016 and 2025. Key thematic areas include pharmacologic mechanisms, efficacy, safety, public behaviour, affordability, off-label misuse, and policy gaps. Tirzepatide demonstrates superior glycemic and weight-loss outcomes compared to semaglutide, largely due to its dual GLP-1/GIP activity and enhanced neurobehavioral effects on appetite regulation. Semaglutide, however, retains proven cardiovascular benefits, while similar outcomes for tirzepatide await results from the ongoing SURPASS-CVOT trial. In Saudi Arabia, off-label and cosmetic use of these agents has proliferated, fueled by social media influence, inequitable access, and unregulated parallel markets. High drug costs and limited insurance coverage continue to restrict access for clinically indicated patients. Clinical audits and qualitative studies further reveal significant misuse among non-obese individuals, contributing to medication shortages and threatening equitable distribution. While GLP-1 and dual incretin therapies hold transformative potential for metabolic health, their misuse, affordability barriers, and sociocultural pressures must be addressed. National strategies involving pricing regulation, controlled prescribing policies, public awareness campaigns, and enhanced pharmacovigilance are urgently needed to optimize clinical impact and safeguard public health.

Keywords: GLP-1 receptor agonists, Trzepatide, Semaglutide, Obesity, Diabetes, Saudi Arabia, Misuse, Vision 2030, Incretin therapies, Pharmacology

INTRODUCTION

Saudi Arabia is undergoing a significant epidemiological transition, with obesity and type 2 diabetes mellitus emerging as major contributors to morbidity, mortality, and escalating healthcare costs.[1-4] National studies have documented a steady rise in obesity prevalence across age groups, accompanied by a growing burden of diabetes and other non-communicable diseases linked to urbanization, sedentary lifestyles, and dietary changes.[3-6] This transition

has placed substantial pressure on the healthcare system and intensified the need for effective, evidence-based interventions that address both glycemic control and excess body weight.[4-6]

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have emerged as an important therapeutic class in the management of obesity and type 2 diabetes due to their multifaceted metabolic effects. These agents enhance glucose-dependent insulin secretion, suppress inappropriate glucagon release, delay gastric emptying, and regulate appetite through central nervous system pathways.[8,9,11] Semaglutide, a long-acting GLP-1 RA, has demonstrated substantial efficacy in improving glycemic control and inducing clinically meaningful weight loss in both diabetic and non-diabetic populations.[12-14] More recently, tirzepatide the first dual incretin agonist targeting both GLP-1 and glucose-dependent insulinotropic polypeptide (GIP) receptors has shown superior metabolic efficacy, with greater reductions in HbA1c and body weight compared with GLP-1 monotherapy.[10,12,17]

Real-world data from Saudi Arabia and the Gulf region support the rapid uptake of these therapies, reporting average weight loss of approximately 8-10% with semaglutide and exceeding 15% with tirzepatide.[18-20] These outcomes have contributed to widespread use of GLP-1-based therapies beyond strictly indicated populations. However, increasing popularity has been accompanied by rising off-label and cosmetic-driven use, particularly among younger adults influenced by social media platforms and aesthetic norms.[21-24] Such practices frequently occur without adequate medical supervision, increasing the risk of adverse events including dehydration, hypoglycemia, gastroparesis, and pancreatitis.[26,31]

High medication costs, limited insurance coverage, and intermittent supply shortages have further driven demand toward unregulated online and informal markets, increasing the risk of counterfeit or improperly stored products.[23,48,43] Misuse-related complications have been reported in emergency departments across the Gulf region, raising concerns about patient safety and equitable access to care.[18,29]

Despite these challenges, GLP-1-based therapies align closely with Saudi Vision 2030 goals, which emphasize prevention, value-based care, and reduction of the national burden of obesity, diabetes, and cardiovascular disease.[7,16,34] Nevertheless, their long-term success depends on robust regulatory oversight, equitable access, culturally sensitive public education, and integration within comprehensive lifestyle and behavioural programs. Current literature remains limited in addressing the sociocultural, economic, and policy factors shaping GLP-1 therapy utilization in Saudi Arabia. This review aims to address this gap by synthesizing available evidence on pharmacologic mechanisms, clinical efficacy, safety, real-world use, and regulatory implications within the Saudi and Gulf context.

METHODS

This narrative review synthesized evidence from randomized controlled trials (RCTs), observational studies, national health reports, and regional literature from Saudi Arabia and the broader Gulf region. The study was conducted at King Saud University Medical City (KSUMC) in Riyadh, Saudi Arabia, between September 2023 and March 2025. The objective was to integrate pharmacologic, clinical, sociocultural, and policy-level insights related to the use of GLP-1 receptor agonists and dual incretin therapies in the Gulf region. A comprehensive literature search was performed using PubMed, Scopus, and EMBASE databases. Keywords included: "GLP-1 receptor agonists," "semaglutide," "tirzepatide," "dual incretin therapy," "Saudi Arabia," "Gulf countries," "obesity," "diabetes," "misuse," and "Vision 2030." Boolean operators and Medical Subject Headings (MeSH) terms were applied where appropriate to refine search sensitivity. Additional grey literature, including national health policy documents and Ministry of Health reports, was reviewed to capture relevant but non-indexed data sources.

Inclusion criteria

Inclusion criteria included randomized controlled trials or observational studies evaluating semaglutide, tirzepatide, or related GLP-1 therapies conducted in Saudi Arabia or Gulf countries. Peer-reviewed articles and government-issued reports published between January 2016 and March 2025. Studies reporting on pharmacologic mechanisms, clinical efficacy, safety, public utilization, misuse trends, access issues, or regulatory responses.

Exclusion criteria

Exclusion criteria included studies not related to the Gulf region or without relevance to clinical or policy applications of GLP-1 therapies. Publications lacking methodological rigor or quality (e.g., non-peer-reviewed opinion pieces, low-quality reviews). Duplicate studies or reports with insufficient data on clinical outcomes or health-system context.

To minimize selection bias, two independent reviewers screened all titles, abstracts, and full texts for eligibility. Discrepancies were resolved through discussion and consensus.

Data were thematically categorized into six domains: pharmacologic mechanisms, clinical efficacy, safety and tolerability, public perception and behavioural trends, affordability and access, and regulatory frameworks. Due to heterogeneity in study designs and outcomes, no meta-analysis was conducted.

Mechanism of action of GLP-1 and dual incretin therapies

GLP-1 RAs exert their metabolic effects through multiple complementary mechanisms that regulate glucose homeostasis and energy balance. These agents stimulate insulin secretion in a glucose-dependent manner, suppress inappropriate glucagon release, delay gastric emptying, and reduce appetite through central nervous system pathways involving the hypothalamus and brainstem.[8,9,11] Collectively, these effects improve postprandial glucose control and promote clinically meaningful weight loss while minimizing the risk of hypoglycemia in the absence of concomitant insulin or sulfonylurea therapy.[18]

Semaglutide, a long-acting GLP-1 RA, has been shown to exert potent effects on satiety signalling and caloric intake by activating GLP-1 receptors in appetite-regulating centers of the brain.[10,12] Its prolonged half-life allows once-weekly administration, contributing to improved adherence and sustained metabolic benefits.[13,14] However, GLP-1 receptor activation alone targets a single incretin pathway, which may limit the magnitude of metabolic improvement in individuals with advanced insulin resistance or complex metabolic dysregulation.[11] Tirzepatide represents a novel pharmacological approach as the first dual incretin agonist, simultaneously activating GLP-1 and glucose-dependent insulinotropic polypeptide (GIP) receptors. Dual incretin stimulation enhances pancreatic β-cell responsiveness, improves peripheral insulin sensitivity—particularly within adipose tissue—and reduces postprandial triglyceride excursions.[10,12,28] Post-hoc analyses of SURPASS clinical trials have demonstrated favorable effects on lipid profiles, including reductions in triglycerides and бих low-density lipoprotein cholesterol, suggesting broader cardiometabolic benefits beyond glycemic control.[28] In addition to peripheral metabolic effects, emerging evidence suggests that dual incretin therapy may exert enhanced central nervous system actions compared with GLP-1 monotherapy. Tirzepatide appears to more effectively modulate neural circuits associated with reward anticipation and hedonic eating, including pathways involving the nucleus accumbens and insular cortex.[17] These neurobehavioral effects may contribute to stronger appetite suppression, reduced food cravings, and improved long-term adherence, particularly in individuals with stress-related or reward-driven eating behaviors.[31]

Importantly, regional studies have highlighted metabolic profiles common in Middle Eastern populations such as visceral adiposity, mixed dyslipidemia, and hepatic insulin resistance that may particularly benefit from the broader endocrine and metabolic actions of dual incretin therapy.[24,37] These findings underscore the need to tailor therapeutic strategies to population-specific metabolic characteristics rather than relying solely on extrapolation from Western cohorts. Taken together, the complementary hormonal and neurobehavioral mechanisms of tirzepatide provide a biologically plausible explanation for its superior clinical efficacy in reducing HbA1c and body weight compared with GLP-1 receptor agonist monotherapy.[15-17] These mechanistic advantages position dual incretin therapy as a promising pharmacologic strategy for patients with obesity and type 2 diabetes, particularly those with complex metabolic disturbances or behavioral drivers of overeating.

Clinical efficacy and sociocultural challenges of GLP-1 therapies in Saudi Arabia

Semaglutide and tirzepatide have substantially transformed the pharmacological management of type 2 diabetes and obesity through robust glycemic and weight-loss effects. Semaglutide consistently reduces glycated hemoglobin (HbA1c) by approximately 1.5–2.0% by enhancing glucose-dependent insulin secretion, suppressing glucagon release, and delaying gastric emptying.[12,14] Tirzepatide, through dual activation of GLP-1 and GIP receptors, offers superior glycemic efficacy, achieving HbA1c reductions of up to 2.4%.15,16 In the SURPASS-2 randomized controlled trial, 81–92% of patients receiving tirzepatide achieved HbA1c levels below 7.0%, compared with 79% of those treated with semaglutide, highlighting its enhanced insulinotropic and insulin-sensitizing effects.[12] Weight-loss outcomes further differentiate these agents. Once-weekly semaglutide at a dose of 2.4 mg has been shown to induce mean body weight reductions of 10–15% in both diabetic and non-diabetic populations.[13,14] In contrast, tirzepatide produces greater weight loss, with reductions ranging from 15% to 22%.15,17 The SURMOUNT-1 trial reported a mean weight reduction of 20.9% at the highest tirzepatide dose, significantly exceeding outcomes observed with semaglutide in comparable cohorts.[17] Dual incretin activation appears to enhance satiety signaling and reduce reward-driven eating, contributing to improved adherence and sustained weight loss.[17,31] Cardiovascular outcomes represent an important consideration in the long-term management of metabolic disease. Semaglutide has demonstrated robust cardiovascular benefit, including a 26% reduction in major adverse cardiovascular events (MACE) in patients with type 2 diabetes at high cardiovascular risk in the SUSTAIN-6 trial.[16] Additionally, the SELECT trial showed a 20% reduction in all-cause mortality among individuals with obesity without diabetes, reinforcing semaglutide's cardioprotective profile.[15] Tirzepatide has demonstrated favorable effects on lipid parameters, inflammatory markers, and visceral adiposity; however, definitive cardiovascular outcome data are pending from the ongoing SURPASS-CVOT trial.[36] Despite strong clinical efficacy, the real-world impact of GLP-1–based therapies in Saudi Arabia is moderated by substantial sociocultural and economic challenges.

High medication costs and limited insurance reimbursement have restricted access for many patients at greatest metabolic risk.[23,42] Semaglutide is typically priced between 400 and 700 Saudi Riyals per weekly dose, while

tirzepatide may cost between 2,000 and 9,000 Saudi Riyals per month, placing both therapies beyond the reach of many low- and middle-income individuals.[23,42]

These access barriers have contributed to widespread off-label and cosmetic-driven use, particularly among younger women influenced by social media platforms and prevailing beauty standards.[21,22,39] Qualitative studies from Riyadh clinics indicate that a substantial proportion of GLP-1 prescriptions are issued for non-clinical aesthetic purposes, often in the absence of obesity or metabolic disease.[21,41] Such practices raise ethical concerns and increase the risk of adverse events, including dehydration, hypoglycemia, and gastrointestinal complications, particularly when medications are self-administered without appropriate medical supervision.[26,33] Furthermore, limited availability and high demand have fueled parallel-market distribution and online sales of GLP-1 therapies, increasing exposure to counterfeit or improperly stored products.[24,29]

Reports from Saudi regulatory authorities and pharmacovigilance systems have documented safety risks associated with unauthorized procurement and misuse of incretin-based therapies.[29,33] These dynamics not only threaten patient safety but also exacerbate inequities in access to evidence-based obesity and diabetes care. Collectively, these findings underscore the need for comprehensive national strategies that balance clinical innovation with regulatory oversight, equitable access, and culturally informed public education. Without such measures, GLP-1 therapies risk becoming stratified interventions—misused by individuals without clinical indication while remaining inaccessible to populations with the highest burden of metabolic disease.

RESULTS

Comparative clinical and system-level outcomes of semaglutide and tirzepatide

Glycemic control

Semaglutide demonstrated consistent and clinically meaningful reductions in glycated hemoglobin (HbA1c), ranging from 1.5% to 2.0% across randomized controlled trials and real-world studies.[12,14] These effects are primarily mediated through glucose-dependent insulin secretion, suppression of inappropriate glucagon release, and delayed gastric emptying.[8,11] In contrast, tirzepatide achieved superior glycemic efficacy, with HbA1c reductions of up to 2.4%, reflecting its dual incretin mechanism and enhanced β-cell responsiveness.[15,16]

In the SURPASS-2 trial, 81–92% of patients treated with tirzepatide achieved HbA1c levels below 7.0%, compared with 79% of patients receiving semaglutide (1 mg weekly).[12] A higher proportion of tirzepatide-treated patients also achieved more stringent glycemic targets (HbA1c <6.5%) without intensification of background therapy.[16] These findings suggest that tirzepatide may offer particular benefit in patients with marked insulin resistance or suboptimal glycemic control on GLP-1 receptor agonist monotherapy.

Weight-loss outcomes

Semaglutide at a dose of 2.4 mg has been associated with mean body weight reductions of 10–15% in individuals with obesity, with consistent efficacy across diabetic and non-diabetic populations.[13,14] Weight loss with semaglutide is driven by central appetite suppression, delayed gastric emptying, and reduced caloric intake.[10,11] Tirzepatide demonstrated significantly greater weight-loss efficacy, achieving reductions ranging from 15% to 22%.[15,17] In the SURMOUNT-1 trial, participants receiving the highest dose of tirzepatide experienced a mean weight loss of 20.9%, exceeding outcomes reported with semaglutide in comparable study populations.[17] Dual incretin activation appears to enhance satiety signaling and reduce reward-driven eating behaviors, contributing to sustained weight reduction and improved long-term adherence.[17,31]

Cardiovascular outcomes

Among incretin-based therapies, semaglutide currently has the most robust cardiovascular outcome data. In the SUSTAIN-6 trial, semaglutide reduced the risk of major adverse cardiovascular events (MACE) by 26% in patients with type 2 diabetes at high cardiovascular risk.[16] The SELECT trial further extended these findings to individuals with obesity without diabetes, demonstrating a 20% reduction in all-cause mortality.[15] These results position semaglutide as a preferred option for patients with established cardiovascular disease or elevated cardiovascular risk. Tirzepatide has demonstrated favorable effects on cardiovascular risk markers, including improvements in lipid profiles, reductions in visceral adiposity, and attenuation of inflammatory markers.[28,35] However, definitive cardiovascular outcome data are pending from the ongoing SURPASS-CVOT trial.[36] Until these results become available, tirzepatide's cardiovascular benefit remains inferential rather than outcome-based.

Adherence and real-world use

Both semaglutide and tirzepatide are administered as once-weekly subcutaneous injections; however, real-world data suggest higher treatment satisfaction and adherence with tirzepatide. Qualitative and observational studies report fewer gastrointestinal adverse effects—particularly nausea and vomiting—among tirzepatide users compared with those receiving semaglutide.[30,38] Patients receiving tirzepatide also reported earlier satiety, stronger appetite suppression, and reduced meal-related discomfort, contributing to improved persistence with therapy.[30,38] Given the chronic nature of obesity and type 2 diabetes, adherence is a critical determinant of long-term treatment success. Current American Diabetes Association

guidelines emphasize the importance of incorporating patient experience and quality-of-life considerations when selecting pharmacologic therapies for metabolic disease.[19] These patient-centered advantages may partly explain the increasing preference for tirzepatide in real-world clinical practice.

Access, affordability, and system-level challenges in Saudi Arabia

Despite their therapeutic efficacy, access to GLP-1–based therapies in Saudi Arabia remains constrained by high costs and limited insurance coverage. Semaglutide is typically priced between 400 and 700 Saudi Riyals per weekly dose, while tirzepatide ranges from approximately 2,000 to 9,000 Saudi Riyals per month.[23,42] These costs disproportionately affect low- and middle-income populations, who bear the highest burden of obesity and type 2 diabetes.[37,38] Limited affordability and inconsistent supply have driven increased reliance on parallel-market distribution, including unauthorized online sales and informal procurement channels.[24,29] Reports from Saudi regulatory authorities have highlighted the circulation of counterfeit or improperly stored GLP-1 products, posing significant safety risks.[29,33] These dynamics have also contributed to medication shortages, further limiting access for clinically eligible patients and undermining equitable delivery of care (Table 1).

Table 1: Comparative summary of semaglutide and tirzepatide

Parameters	Semaglutide	Tirzepatide
Drug class	GLP-1 receptor agonist	Dual GLP-1/GIP receptor agonist
HbA1c reduction (%)	1.5–2.0	Up to 2.4
Weight loss (%)	10–15% (up to 14.9%)	15–22% (mean ≈20.9%)
Cardiovascular outcome data	Proven (SUSTAIN-6, SELECT trials)	Pending (SURPASS-CVOT ongoing)
Dosing	Weekly subcutaneous injection	Weekly subcutaneous injection
GI adverse events	Nausea, vomiting (moderate)	Lower GI side effects; improved tolerability
Real-world adherence	Moderate	Higher adherence and satisfaction
Cost in Saudi Arabia (2024)	400–700 SAR per week	2,000–9,000 SAR per month
Approved indications	Type 2 diabetes; obesity	Type 2 diabetes (obesity pending in some regions)
Cosmetic/off-label use	High prevalence	Increasing for non-medical purposes

DISCUSSION

This narrative review highlights the transformative potential of glucagon-like peptide-1 receptor agonists and dual incretin therapies in addressing the growing burden of obesity and type 2 diabetes in Saudi Arabia, while also underscoring critical clinical, sociocultural, and health-system challenges that may limit their equitable and sustainable impact. The available evidence consistently demonstrates superior glycemic and weight-loss efficacy of tirzepatide compared with GLP-1 receptor agonist monotherapy, alongside robust cardiovascular benefit associated with semaglutide.[12,15-17] However, the real-world translation of these benefits in the Saudi context is shaped by affordability, regulatory oversight, prescribing practices, and public perception. From a clinical perspective, the dual incretin mechanism of tirzepatide provides a plausible biological explanation for its enhanced efficacy in reducing HbA1c and body weight.[15-17] Improvements in insulin sensitivity, lipid metabolism, and appetite regulation may be particularly relevant in Middle Eastern populations characterized by visceral adiposity, hepatic insulin resistance, and mixed dyslipidemia.[24,37] These population-specific metabolic profiles suggest that regional treatment guidelines may benefit from stratified recommendations that go beyond extrapolation from Western cohorts. Cardiovascular outcomes remain a central consideration in therapy selection. Semaglutide has demonstrated consistent reductions in major adverse cardiovascular events and all-cause mortality, positioning it as a preferred agent for patients with established cardiovascular disease or high cardiovascular risk.[14,15] In contrast, while tirzepatide has shown favorable effects on cardiovascular risk markers, definitive outcome data are pending.[36] Until results from the SURPASS-CVOT trial are available, clinicians must balance tirzepatide's superior metabolic efficacy against the strength of semaglutide's cardiovascular evidence. Despite these clinical advances, access and affordability remain major barriers to effective implementation in Saudi Arabia. High out-of-pocket costs and limited insurance reimbursement disproportionately exclude low- and middle-income populations groups that carry the highest burden of metabolic disease.[23,42] This inequity not only undermines public health objectives but also contradicts the principles of value-based care emphasized in Saudi Vision 2030.[7,34] Without policy-level interventions addressing pricing, reimbursement, and formulary inclusion, GLP-1–based therapies risk becoming stratified treatments accessible primarily to socioeconomically advantaged groups. The rapid rise in cosmetic-driven and off-label use further complicates the therapeutic landscape.

Evidence from Saudi and regional studies indicates that social media platforms play a significant role in shaping public demand for GLP-1 therapies, often reframing these medications as aesthetic solutions rather than medical treatments.[21,22,39] Such narratives contribute to

inappropriate prescribing pressure on clinicians, unsupervised self-administration, and increased risk of adverse events.[26,33] The ethical implications of prescribing potent metabolic agents for non-clinical indications warrant careful consideration, particularly in the context of limited national supply and growing misuse.

Regulatory challenges also extend to medication safety. Reports of counterfeit and improperly stored GLP-1 products circulating through parallel markets pose serious risks to patient safety and pharmacovigilance efforts.[29,33] Strengthening regulatory enforcement, improving supply-chain transparency, and expanding public awareness of medication safety are essential to mitigating these risks. In this regard, the role of the Saudi Food and Drug Authority and national pharmacovigilance systems is critical.[29,33] Importantly, pharmacotherapy alone is unlikely to achieve sustained population-level impact without integration into comprehensive lifestyle and behavioural interventions. International guidelines emphasize that GLP-1–based therapies should complement, rather than replace, structured programs addressing diet, physical activity, and psychosocial determinants of health.[19] In the Saudi context, culturally tailored education and community-based initiatives are particularly important to address behavioral drivers of obesity and to counter misinformation propagated through digital media. This review has several limitations. As a narrative synthesis, it does not provide quantitative pooled estimates of treatment effect, and heterogeneity across included studies limits direct comparability. Additionally, real-world data from Saudi Arabia remain relatively limited, highlighting the need for national registries and longitudinal outcome studies to inform context-specific clinical and policy decisions. In conclusion, GLP-1 receptor agonists and dual incretin therapies represent powerful tools in the management of obesity and type 2 diabetes in Saudi Arabia. Their successful integration into the healthcare system will require coordinated efforts encompassing regulatory reform, equitable financing, clinician education, and culturally sensitive public engagement. Aligning these strategies with Vision 2030 objectives offers a unique opportunity to harness pharmacologic innovation while advancing population health and health-system sustainability (Table 2).

Table 2: Challenges and policy recommendations for GLP-1 therapies in Saudi Arabia.

Challenge	Impact	Policy recommendation
Off-label cosmetic use	Drug shortages, misuse, safety concerns	Controlled prescribing, public education
High cost and limited insurance	Inequitable access, especially in low-income groups	Pricing reform, insurance coverage expansion
Parallel market/counterfeit drugs	Increased adverse events, unregulated access	Regulatory enforcement, supply chain monitoring
Social media misinformation	Misleading health claims, aesthetic framing	Digital health campaigns, influencer regulation
Weak prescriber oversight	Ethical conflicts, inappropriate demand fulfillment	Clinical eligibility protocols, national prescriber audits

CONCLUSION

GLP-1 receptor agonists and dual incretin therapies represent a significant advancement in the pharmacological management of obesity and type 2 diabetes in Saudi Arabia. Evidence consistently demonstrates that semaglutide provides substantial improvements in glycemic control, weight reduction, and cardiovascular outcomes, while tirzepatide offers superior metabolic efficacy through dual incretin activation, resulting in greater reductions in HbA1c and body weight.[12,15-17] These therapeutic benefits are particularly relevant in the Saudi population, where obesity, diabetes, and cardiometabolic risk factors remain highly prevalent.[1-7] Despite their clinical promise, the real-world impact of GLP-1–based therapies in Saudi Arabia is constrained by significant challenges related to affordability, access, and misuse.

High medication costs, limited insurance coverage, and supply shortages have contributed to inequitable access and driven demand toward off-label, cosmetic-driven use and parallel-market procurement.[21-24,28,42] These trends raise ethical concerns, compromise patient safety, and risk diverting essential therapies away from individuals with genuine clinical need.[26,29,33] Alignment of GLP-1–based therapies with Saudi Vision 2030 objectives requires a coordinated national approach that integrates pharmacologic innovation with regulatory oversight, equitable financing mechanisms, and culturally sensitive public education.[7,34]

Strengthening prescribing governance, expanding insurance coverage for evidence-based indications, and enhancing pharmacovigilance are critical to ensuring safe and appropriate use.[29,33] Additionally, integrating these therapies into comprehensive lifestyle and behavioural interventions is essential to achieving sustainable, population-level reductions in obesity and diabetes burden.[19]

In summary, GLP-1 receptor agonists and dual incretin therapies have the potential to play a transformative role in addressing Saudi Arabia's metabolic disease burden. Realizing this potential will depend not only on clinical

efficacy but also on policy-driven efforts to promote equity, safety, and long-term sustainability within the healthcare system.

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