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Semaglutide (Ozempic®) and non-prescription aesthetic use: risks and future consequences

Semaglutida (Ozempic®) e uso estético sem receita: riscos e consequências futuras

Semaglutida (Ozempic®) y su uso sin receta en cosmética: riesgos y consecuencias futuras

Débora Cristina Faria Maximiano[1], Luciano Lobo Gatti[1], Douglas Fernandes da Silva[1].

ABSTRACT

Objective: The main objective of this study is to analyze the indiscriminate use of Semaglutide and the impacts that this practice may generate in the future. With the increasing use of this medication for non-prescription purposes, especially for weight loss, it is essential to understand the clinical, social and economic consequences of this trend. **Literature review:** This study was a narrative review of the off-label use of semaglutide (Ozempic®) for aesthetic purposes, highlighting its clinical and social risks. Although approved for the treatment of type 2 diabetes, its popularization on social media and self-medication have led to relevant adverse events, such as pancreatitis and gastrointestinal disorders. The review discussed the impact on the availability of the drug for diabetics and emphasized the importance of multidisciplinary management. Finally, it emphasized the essential role of biomedical professionals in promoting rational use, laboratory monitoring, and health education to reduce harm to public health. **Final considerations:** This review study analyzed the risks of indiscriminate use of semaglutide (Ozempic®), especially for aesthetic purposes and without medical advice. Despite its effectiveness in the treatment of type 2 diabetes and weight loss, uncontrolled use can cause serious adverse effects. The popularization of the drug on social media has favored self-medication. The work highlights the need for regulation, adequate information and more studies on the effects on non-diabetics.

Keywords: Semaglutide, Ozempic, Diabetes Mellitus, Obesity, Biomedicine.

RESUMO

Objetivo: Analisar o uso indiscriminado da Semaglutida e os impactos que essa prática pode gerar no futuro. Com o crescente uso desse medicamento para fins não prescritos, especialmente para emagrecimento, torna-se essencial compreender as consequências clínicas, sociais e econômicas dessa tendência. **Revisão bibliográfica:** O presente trabalho tratou-se de uma revisão narrativa do uso não prescrito (off-label) da semaglutida (Ozempic®) para fins estéticos, destacando seus riscos clínicos e sociais. Embora aprovada para o tratamento do diabetes tipo 2, a popularização nas redes sociais e a automedicação têm levado a eventos adversos relevantes, como pancreatite e distúrbios gastrointestinais. A revisão discutiu o impacto na disponibilidade do fármaco para diabéticos e ressalta a importância de um manejo multiprofissional. Por fim, enfatizou o papel essencial do biomédico na promoção do uso racional, no monitoramento laboratorial e na educação em saúde para reduzir danos à saúde pública. **Considerações finais:** Este estudo de revisão analisou os riscos do uso indiscriminado da Semaglutida (Ozempic®), especialmente para fins estéticos e

[1] University Center of the Integrated Faculties of Ourinhos (UNIFIO), Ourinhos - SP.

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sem orientação médica. Apesar da eficácia no tratamento da diabetes tipo 2 e na perda de peso, o uso descontrolado pode causar efeitos adversos graves. A popularização do medicamento nas redes sociais tem favorecido a automedicação. O trabalho destaca a necessidade de regulamentação, informação adequada e mais estudos sobre os efeitos em não diabéticos.

Palavras-chave: Semaglutida, Ozempic, Diabetes Mellitus, Obesidade, Biomedicina.

RESUMEN

Objetivo: El objetivo principal de este estudio es analizar el uso indiscriminado de semaglutida y el impacto que esta práctica podría generar en el futuro. Ante el creciente uso de este medicamento sin receta, especialmente para la pérdida de peso, es fundamental comprender las consecuencias clínicas, sociales y económicas de esta tendencia. **Revisión bibliográfica:** Este estudio consistió en una revisión narrativa del uso no autorizado de semaglutida (Ozempic®) con fines estéticos, destacando sus riesgos clínicos y sociales. Si bien está aprobado para el tratamiento de la diabetes tipo 2, su popularización en redes sociales y la automedicación han provocado eventos adversos relevantes, como pancreatitis y trastornos gastrointestinales. La revisión analizó el impacto en la disponibilidad del fármaco para diabéticos y enfatizó la importancia del manejo multidisciplinario. Finalmente, destacó el papel esencial de los profesionales biomédicos en la promoción del uso racional, la monitorización de laboratorio y la educación sanitaria para reducir los daños a la salud pública. **Consideraciones finales:** Este estudio de revisión analizó los riesgos del uso indiscriminado de semaglutida (Ozempic®), especialmente con fines estéticos y sin consejo médico. A pesar de su eficacia en el tratamiento de la diabetes tipo 2 y la pérdida de peso, el uso incontrolado puede causar efectos adversos graves. La popularización del fármaco en redes sociales ha favorecido la automedicación. El trabajo destaca la necesidad de regulación, información adecuada y más estudios sobre los efectos en personas no diabéticas.

Palabras clave: Semaglutida, Ozempic, Diabetes Mellitus, Obesidad, Biomedicina.

INTRODUCTION

Semaglutide (Ozempic®) is a GLP-1 analogue approved for the treatment of type 2 diabetes due to its ability to stimulate insulin secretion and inhibit glucagon release, thus promoting glycemic homeostasis (HÆDERSDAL S, et al., 2018). Recently, according to the authors Novograd J, et.al. (2022), its popularity has increased due to its action in reducing appetite and consequent weight loss, leading to indiscriminate use and without medical supervision.

Recent studies show that the use of semaglutide without adequate professional supervision can trigger relevant adverse effects, such as nausea, vomiting, diarrhea, and constipation (LINHARES FS, et al., 2024). Additionally, Leehey DJ, et al. (2021) reports the occurrence of dehydration and renal dysfunction, possibly related to the inappropriate use of the drug. Another associated clinical risk is the development of acute pancreatitis and cholelithiasis, especially in individuals with predisposing factors (DAGHER C, et al., 2025).

The growing popularity of semaglutide (Ozempic®) for aesthetic purposes, largely driven by media influences and social networks, has contributed to its indiscriminate use without a prescription. This practice not only exposes individuals to considerable clinical risks but also compromises access to the drug for patients with proven therapeutic indication, such as those with type 2 diabetes mellitus, favoring shortages in healthcare settings (BEZERRA TPW, et al., 2024).

Obesity is one of the main public health challenges on a global scale, characterized by excessive accumulation of adipose tissue and associated with a significant increase in the risk of cardiovascular disease, type 2 diabetes mellitus (T2DM), dyslipidemia, and other metabolic conditions (WORLD HEALTH ORGANIZATION, 2025). It is a multifactorial condition, influenced by genetic, behavioral, hormonal, psychological, and environmental determinants, such as sedentary lifestyle and inadequate eating habits.

Despite the proven effectiveness of interventions based on lifestyle modification, such as a balanced diet and regular physical activity, maintaining weight loss in the long term still represents a challenge for most individuals. This limitation has driven the development and adoption of pharmacological approaches as a complementary strategy in the clinical management of obesity (SAGRATZKI RMG, et al., 2023).

Obesity is commonly classified using the Body Mass Index (BMI - weight (kg)/height² (m²)), an indicator widely adopted by the World Health Organization (WHO) to estimate the relationship between body weight and height. According to WHO criteria, individuals with a BMI between 25.0 and 29.9 kg/m² are classified as overweight, while values equal to or greater than 30.0 kg/m² indicate obesity (WORLD HEALTH ORGANIZATION, 2025)

According to estimates by the World Health Organization (WHO), by 2025, approximately 160 million people — including adults and children — will suffer health problems due to being overweight or obese (WORLD HEALTH ORGANIZATION, 2025). In the Brazilian context, there has been an alarming increase in the prevalence of obesity, with a 72% increase over the last thirteen years. According to data from the Ministry of Health, more than 7.5 million Brazilians already suffer from this condition, of which approximately 863 thousand are morbidly obese, with a Body Mass Index (BMI) greater than 40 kg/m² (COSTA ACC, et al., 2024). These indicators highlight the urgency of implementing effective strategies to address this issue, involving both public policies aimed at promoting health and pharmacological interventions and sustainable preventive actions.

The search for immediate results, often driven by social pressures and contemporary aesthetic standards, has led many individuals to resort to quick solutions for weight loss, especially using medications that promise weight loss without the need for significant lifestyle changes. In this scenario, semaglutide (Ozempic®) has gained prominence as an innovative pharmacological agent in the management of obesity, due to its mechanism of action that promotes satiety, delays gastric emptying and contributes to the reduction of caloric intake (AHRÉN B, et al., 2018).

A semaglutida (Ozempic®) é um agonista do receptor do peptídeo-1 semelhante ao glucagon (GLP-1), cuja aprovação para o tratamento da obesidade foi consolidada pela Food and Drug Administration (FDA) em 2021. Sua indicação clínica é restrita a indivíduos com obesidade ou sobrepeso associado a comorbidades, atuando na regulação do peso corporal por meio da supressão do apetite, do retardo do esvaziamento gástrico e da modulação dos níveis glicêmicos (LEXCHIN J and MINTZES B, 2023).

The indiscriminate use of semaglutide, especially outside its clinical indications, has generated growing concern in the public health field. Although this drug, commercially known as Ozempic®, has been approved for the treatment of type 2 diabetes mellitus, its effect on reducing body weight has driven its use by individuals without a diagnosis of diabetes, often for aesthetic purposes and without a medical prescription. This practice has been facilitated by wide media coverage, easy access to the drug and the social search for quick solutions for weight loss.

The administration of semaglutide without adequate professional supervision exposes users to relevant adverse effects, such as gastrointestinal disorders, dehydration, metabolic dysfunctions and more serious risks, such as pancreatitis and renal failure. In addition, using outside the therapeutic scope compromises the availability of the drug for patients who truly depend on it for glycemic control, accentuating inequalities in access to treatment and negatively impacting health systems.

This scenario highlights the urgency of public policies that promote stricter regulations for the prescription and marketing of GLP-1 receptor agonists, as well as the need for educational campaigns aimed at raising public awareness about the risks of unsupervised drug use. In this context, this study is justified by the relevance of critically reviewing scientific literature on the metabolic and clinical risks associated with the uncontrolled use of semaglutide, also highlighting the strategic role of biomedical professionals in monitoring, health education and evidence-based counseling. Interdisciplinary action, integrating professionals such as physicians, nutritionists, pharmacists and biomedical professionals, is essential to ensure an ethical, safe and effective approach to the management of obesity and the rational use of pharmacological therapies.

LITERATURE REVIEW

Semaglutide, a glucagon-like peptide-1 (GLP-1) receptor agonist, is widely used in the management of type 2 diabetes mellitus (MAHAPATRA MK, KARUPPASAMY M, SAHOO BM, 2022). However, its off-label use for aesthetic purposes, especially for weight loss, has raised concerns about the potential risks and associated clinical repercussions (HAN SH, et al., 2024). Literature reviews indicate that the unsupervised use of semaglutide is correlated with the occurrence of significant adverse events, including gastrointestinal disorders, liver disease, pancreatitis, as well as changes in basal metabolism and energy homeostasis. In this scenario, the importance of biomedical professionals in promoting the rational and safe use of these pharmacological therapies is evident, playing a crucial role in minimizing risks to public health.

Obesity and the role of GLP-1 agonists

Obesity should not be understood as an isolated clinical condition, but rather as a multifactorial phenomenon resulting from the complex interaction between several metabolic, genetic and environmental disorders. Although it presents a common phenotype — the excessive accumulation of adipose tissue — its etiology involves both mechanisms related to Mendelian inheritance and the epigenetic regulation of gene expression, modulated by environmental, behavioral and psychosocial factors (PEREIRA LO, FRANCISCHI RP, LANCHA AH., 2003).

Obesity is a multifactorial condition resulting from the complex interaction between genetic, epigenetic, environmental, behavioral and psychosocial factors. Its main phenotypic manifestation is the excessive accumulation of adipose tissue and is recognized as one of the main concerns in contemporary public health. **Table 1** presents a systematic compilation of these factors and their respective implications in the pathophysiology of obesity.

Table 1 - Factors involved in the etiology of obesity.

Factor category	Description	Implications for obesity	Reference
Genetics	Mendelian inheritance, genetic polymorphisms, family history	Predisposition to obesity, changes in basal metabolic rate, fat storage	(TIRTHANI E, SAID MS, REHMAN A, 2025)
Epigenetics	DNA methylation, histone modifications, post-transcriptional regulation	Influence the expression of genes related to appetite and metabolism	(MAHMOUD AM, 2022)
Environmental	Lifestyle, urbanization, exposure to ultra-processed foods	Increased calorie consumption and reduced physical activity	(YADAV HM, JAWAHAR A, 2025)
Behavioral	Dietary patterns, inadequate sleep, alcohol and tobacco consumption	They contribute to energy imbalance and fat accumulation	(POOROLAJAL J, et al., 2020)
Psychosocial	Stress, anxiety, depression, socioeconomic context	May trigger emotional eating and resistance to therapeutic adherence	(ANDRIE EK, et al., 2021)

Source: Maximiano DCF, et al., 2025. Fundamented in: Tirthani E, Said MS, Rehman A, 2025; Mahmoud AM, 2022; Yadav HM, Jawahar A, 2025; Poorolajal J, et al., 2020; Andrie EK, et al., 2021.

Obesity is a multifactorial condition resulting from the interaction between genetic, epigenetic, environmental, behavioral and psychosocial factors. The literature shows that genetic and epigenetic alterations influence the predisposition to weight gain, while environmental and behavioral factors, such as a sedentary lifestyle and poor diet, contribute to the development and maintenance of the condition. Psychosocial aspects, such as stress and low socioeconomic status, also play a relevant role in modulating eating behavior. Given this complexity, the importance of a multidisciplinary approach in the management of obesity is highlighted, in which the biomedical professional plays an essential role in laboratory investigation, diagnostic support and the promotion of the rational use of the therapeutic interventions.

The high prevalence of obesity observed in recent decades is closely related to environmental and behavioral determinants, notably the changes imposed by the urbanization process and the increasing consumption of ultra-processed foods. These factors have played a central role in the contemporary nutritional transition, favoring a positive energy balance and contributing to the progressive increase in body weight in the general population (SILVA FMO, et al., 2019).

Reduced physical activity and increased sedentary behavior are directly associated with the rise in obesity and are influenced by the family environment from childhood (PEREIRA LO, et al., 2003). Regular exercise is essential to prevent metabolic syndromes and promote health benefits, including appetite regulation, reduced smoking, and stress control, reinforcing the need for policies that encourage its adoption by the population (CUNHA CLP, 2022).

Factors such as the difficulty in maintaining weight loss, the limited time available to adopt healthy habits, and the wide availability of ultra-processed foods lead many individuals to opt for practical but nutritionally inadequate alternatives. In this context, the Psychosomatic Model of Obesity stands out, which postulates that individuals, especially women, in situations of emotional distress — such as depression, anxiety, sadness, and anger — may resort to compulsive eating as a compensatory mechanism (BERNARDI F, et al., 2005).

In the absence of consistent lifestyle changes, such as a balanced diet, regular physical activity, and behavioral reeducation, the weight loss achieved tends to be temporary, with a high probability of weight regain, often at levels higher than the initial level, characterizing the so-called rebound effect (PIRES WEBER T, et al., 2023).

Semaglutide, marketed as Ozempic®, is a glucagon-like peptide-1 receptor agonist (GLP-1RA) approved by the Food and Drug Administration (FDA) for the treatment of type 2 diabetes mellitus. Its therapeutic action is based on the selective activation of GLP-1 receptors, mimicking the action of the endogenous hormone, which results in the stimulation of glucose-dependent insulin secretion, suppression of glucagon secretion, delayed gastric emptying and increased satiety. These mechanisms contribute to glycemic control and weight loss in patients with type 2 diabetes (LYRA R, et al., 2024).

The approval of semaglutide for the treatment of type 2 diabetes was based on clinical studies that demonstrated its efficacy in improving glycemic control and reducing body weight. In addition, semaglutide has shown additional benefits, such as reducing the risk of cardiovascular events in patients with type 2 diabetes and established cardiovascular disease (PERKOVIC V, et al., 2024).

Given the difficulties faced by the obese population in managing body weight, pharmacological therapies, such as glucagon-like peptide-1 receptor agonists (GLP-1RA), emerge as complementary strategies. Initially, semaglutide (Ozempic®) was approved for the treatment of type 2 diabetes mellitus, acting by activating GLP-1 receptors, mimicking the action of the endogenous hormone (ZANATTA MCA, et al., 2023).

GLP-1 receptor agonists play a fundamental role in stimulating insulin secretion and glycemic regulation. GLP-1 receptor (GLP-1R) mRNA is distributed in several regions of the human brain, including the cerebral cortex, hypothalamus, hippocampus, thalamus, putamen, and dorsal globus pallidus, indicating a broad neuromodulatory action (CASTRO JV, et al., 2023).

Mechanism of action of semaglutide in weight control

Glucagon-like peptide type 1 (GLP-1) was identified in 1983 by Graeme Bell, when sequencing pre-proglucagon, revealing the presence of two peptides with homology to glucagon, including GLP-1 (DRUCKER DJ, 2018). This incretin is synthesized and secreted by enteroendocrine L cells of the small intestine in response to the presence of nutrients in the intestinal lumen, playing a central role in the regulation of glycemic homeostasis (CAMPBELL JE and DRUCKER DJ, 2013). Its main physiological functions include the stimulation of glucose-dependent insulin secretion, inhibition of glucagon release, delay of gastric emptying and induction of satiety, contributing significantly to metabolic control (ZHENG Z, et al., 2024).

Table 2 describes the systemic physiological effects mediated by glucagon-like peptide-1 receptor (GLP-1R) agonists, highlighting the broad pharmacological action of this therapeutic class. Agents such as

semaglutide exert effects that go beyond glycemic control, promoting beneficial responses in multiple organs and systems, demonstrating their multifunctional potential in the clinical context (CAMPBELL JE and DRUCKER DJ, 2013).

Table 2 - Systemic physiological effects mediated by GLP-1R agonists.

Target System/Organ	Physiological effects of GLP-1R agonists	References
Cardiovascular system	↑Glucose utilization ↑Fatty acid metabolism ↑Cardiac function ↑Cardioprotection ↑Vasoprotection ↓Inflammation	(DRUCKER DJ, 2018; MARSO SP, et al., 2016; NAUCK MA and MEIER JJ, 2018)
Intestine	↑Cell growth ↓Lipoprotein secretion	(ABDALQADIR N, ADELI K, 2022; HOFFMAN S, ADELI K, 2024; TAKIZAWA Y, et al., 2022)
Immune system	↓Inflammation	(BENDOTTI G, et al., 2022)
Kidneys	↑Sodium excretion (Na^+)	(HINRICHS GR, HOVIND P, ASMAR A, 2024; SKOV J, et al., 2013)
Brain (CNS)	↓Food intake ↑Neuroprotection ↑Neurogenesis	(SI J, et al., 2025; TRAPP S and BRIERLEY DI, 2022)
Pancreatic β cells	↑Insulin secretion ↑Insulin biosynthesis ↑Cell proliferation ↓Apoptosis	(MAYENDRARAJ A, ROSENKILDE MM, GASBJERG LS, 2022; SHILLEH AH, et al., 2024)
Pancreatic α cells	↓Glucagon secretion	(SHILLEH AH, et al., 2024; ZHANG Y, et al., 2019)
Pancreatic δ cells	↑Somatostatin secretion	(SHILLEH AH, et al., 2024)

Fundamented in: Drucker DJ, 2018; Marso SP, et al., 2016; Nauck MA e Meier JJ, 2018; Abdalqadir N e Adeli K, 2022; Hoffman S, et al., 2022; Bendotti G, et al., 2022; Hinrichs GR, et al., 2024; Skov J, et al., 2013; Si J, et al., 2025; Trapp S e Brierley DI, 2022; Mayendraraj A, et al., 2022; Shilleh AH, et al., 2024; Zhang Y, et al., 2019.
Source: Maximiano DCF, et al., 2025.

As observed in the **Table 2**, in the gastrointestinal tract, activation of GLP-1 receptors stimulates cell growth and reduces lipoprotein secretion, contributing to improved lipid profiles. In the cardiovascular system, these agonists promote better utilization of glucose and fatty acids, optimize cardiac function, and exert cardioprotective and vasoprotective effects, with reduced local inflammation. In the central nervous system, the action of GLP-1R reduces food intake and promotes neuroprotective and neurogenic effects, which have been associated with modulation of eating behavior and improved mental health. In the kidney, there is an increase in sodium excretion, which can help control blood pressure. In the endocrine pancreas, a coordinated response is observed in different cell types: increased insulin secretion and biosynthesis by β cells, inhibition of glucagon secretion by α cells, and stimulation of somatostatin secretion by δ cells. These effects contribute to glycemic homeostasis and preservation of pancreatic function. Additionally, there is a reduction in inflammatory processes mediated by cells of the immune system. These properties make GLP-1R agonists a relevant therapeutic strategy not only in the treatment of type 2 diabetes mellitus, but also in the management of obesity, metabolic dysfunctions, and associated cardiovascular diseases.

Recently approved by the United States Food and Drug Administration (FDA), semaglutide is a glucagon-like peptide-1 receptor agonist (GLP-1RA), initially indicated for the treatment of type 2 diabetes mellitus. It has now been widely used in the management of obesity, due to its effectiveness in reducing body weight. It is administered subcutaneously, in weekly applications, and the drug is marketed under different trade names, such as Ozempic®, Rybelsus® (oral form) and Wegovy®, the latter specifically approved for the treatment of obesity (ULIANA AP, et al., 2024).

Glucagon-like peptide-1 (GLP-1) receptor agonists, initially developed for the treatment of type 2 diabetes mellitus, have also begun to be used in the management of obesity, due to scientific evidence demonstrating

their effectiveness in weight reduction. GLP-1 receptors are widely expressed in neural tissues, which allows these agonists to exert central action when crossing the blood-brain barrier. In the central nervous system, GLP-1 acts to modulate appetite by stimulating satiety centers, both via neural input and by direct action on the hypothalamic nuclei. Similarly, semaglutide plays a relevant role in inducing body weight loss, reinforcing its therapeutic applicability in the context of obesity (SOUZA MVS, et al., 2025).

Glucagon-like peptide-1 (GLP-1) exerts significant metabolic effects in the prandial and postprandial periods, contributing to the regulation of glycemic homeostasis. Its action occurs mainly through the stimulation of glucose-dependent insulin secretion by pancreatic β cells and the simultaneous inhibition of glucagon release by pancreatic α cells, in contexts of hyperglycemia. On the other hand, in situations of hypoglycemia, GLP-1 modulates its activity by favoring glucagon secretion and suppressing insulin release, acting adaptively in the maintenance of adequate plasma glucose levels (CAMPBELL JE and DRUCKER DJ, 2013).

Glucagon-like peptide-1 (GLP-1) receptor agonists have gained significant notoriety in the therapeutic management of obesity due to their multiple physiological effects. In addition to stimulating insulin secretion in a glucose-dependent manner and inhibiting glucagon release in hyperglycemic states, these drugs also delay gastric emptying, promoting slower digestion and prolonging the feeling of satiety (CAMPBELL JE and DRUCKER DJ, 2013).

The efficacy of semaglutide in the treatment of obesity was demonstrated by Staico et al. (MACHADO STAICO B, et al., 2023) through the randomized phase 3 clinical study (STEP 3), in which individuals with obesity were allocated into two groups: one received semaglutide at a dose of 2.4 mg subcutaneously weekly, while the other received placebo. The results demonstrated an average reduction of 14.9% in body weight in the group treated with the drug, which represented a difference of 12.4% compared to the control group, evidencing the clinical efficacy of semaglutide in inducing significant weight loss.

Clinical evidence gathered by Pimentel DC, et al. (2023) demonstrates that GLP-1 analogues, such as semaglutide, are effective and safe in the management of obesity and overweight in adults with comorbidities. When associated with dietary intervention and physical exercise, these drugs promote a 5 to 15% reduction in body weight, in addition to improvements in cardiometabolic parameters, with good tolerability of gastrointestinal adverse effects. Despite the efficacy of semaglutide administered weekly, the authors emphasize the need for additional studies to evaluate its long-term effects.

The cardiometabolic effects of semaglutide demonstrate efficacy in reducing cardiovascular risk in overweight and obese individuals, even in the absence of diabetes mellitus, configuring a promising therapeutic strategy for the prevention of cardiovascular diseases (SASAKI LS, et al., 2024). Despite its effectiveness in weight loss, semaglutide requires judicious use due to the possibility of adverse events. Among the most common effects are hypoglycemia (especially in non-diabetics), gastrointestinal disorders (nausea, vomiting and diarrhea), as well as headache, nasopharyngitis, myalgia, tachycardia and hypersensitivity reactions. There are also reports of less frequent but relevant changes, such as psychiatric, cardiovascular, hepatic, pancreatic, renal, ocular and auditory disorders, which can impact the safety and adherence to treatment (SOUZA MVS, et al., 2025).

Studies suggest that activation of GLP-1 receptors in pancreatic cells can lead to hypertrophy and obstruction of the pancreatic ducts, favoring the development of acute pancreatitis (DAGHER C, et al., 2024). Although there are reports of this association, the data are still inconclusive, requiring more robust investigations into the safety of prolonged use of semaglutide.

Indiscriminate use of semaglutide and its risks

The infodemiological study conducted by Raubenheimer JE, Myburgh PH and Bhagavathula AS (2024) showed a global increase in online interest in semaglutide, with peaks in searches beginning in 2022 and growing through 2023, especially in the US and Canada. These peaks did not directly correlate with regulatory approval dates but coincided with strong traditional media coverage and influences on social networks. The phenomenon of prior searches in certain countries suggests an informational “contagion” effect, where events in one country influence interest in others. The off-label use of semaglutide for weight loss — often driven by

inaccurate information in the media — led to regulatory alerts about drug shortages, negatively impacting diabetic patients who depend on the drug for glycemic control (RAUBENHEIMERJE, MYBURGH PH, BHAGAVATHULA AS, 2024). This pattern signals a global health risk: while some individuals use the drug without medical indication, others are deprived of its access for legitimate reasons. Off-label use, characterized by the application of drugs for purposes not approved by ANVISA, requires careful evaluation by the prescribing professional, who must weigh risks, benefits and scientific support (GOMES HY and TREVISAN M, 2021).

The growing rate of obesity and other metabolic diseases has driven the search for quick solutions, such as the unregulated use of semaglutide, a practice that raises medical, social and ethical concerns, especially in the context of self-medication and its potential adverse effects (BEZERRA TPW, et al., 2024). According to the same authors, this indiscriminate use also contributed to the shortage of the drug, making it difficult for patients with legitimate clinical indications to access it (BEZERRA TPW, et al., 2024).

Semaglutide was approved by the FDA in 2017 for the treatment of type 2 diabetes and, in Brazil, its use was authorized by ANVISA in 2021 for the same purpose. Despite being effective, the drug is associated with adverse events, such as nausea, diarrhea, constipation, vomiting, abdominal pain and pancreatitis - the latter being one of the most reported complications (RIBEIRO WR, BOGÉA EG, 2024).

Studies suggest that activation of GLP-1 receptors in pancreatic cells can lead to hypertrophy and obstruction of the pancreatic ducts, favoring the development of acute pancreatitis (DAGHER C, et al., 2024a). Although there are reports of this association, the data are still inconclusive, requiring more robust investigations into the safety of prolonged use of semaglutide.

Given the popularization of its effects on weight loss, many users neglect the need for lifestyle changes, such as a balanced diet and physical activity, which compromises the effectiveness of the treatment and favors the rebound effect (PORTO GI, et al., 2024). Therefore, it is essential to emphasize that the use of semaglutide must be integrated into multidisciplinary and scientifically based therapeutic strategies.

Rational use of semaglutide

Despite the therapeutic benefits of semaglutide, its use requires vigilance regarding adverse effects, self-medication, and ease of access. Continuous medical monitoring is essential, especially given the risks associated with drug interactions and long-term safety (CAMPOS ABM, et al., 2024). After significant weight loss, many patients abandon nutritional support and healthy habits, which often results in weight regain. This behavior, combined with the increasing indiscriminate use of semaglutide, reinforces the need to monitor its long-term clinical and social impacts. Prescriptions should be made exclusively by trained professionals, within clear guidelines that ensure safe and responsible use.

The increased demand for the drug and its consequent shortage has compromised access for diabetic patients who depend on medication for glycemic control, generating clinical risks and inequality in access to treatment (RYAN N e SAVULESCU J, 2025). In response, on April 16, 2025, ANVISA implemented more restrictive regulations for the marketing of GLP-1 receptor agonists. Sales now require a two-part medical prescription, with mandatory retention, to protect public health in the face of increased consumption and the occurrence of adverse effects. The regulation does not prohibit off-label use but reinforces the need to inform patients about the risks and benefits involved (ANVISA, 2025).

The treatment of obesity requires a multidisciplinary approach, going beyond the idea of quick solutions. Sustainable changes in lifestyle, combined with psychological and nutritional support, must be integrated with the use of medication, promoting effective weight loss and the redefinition of health-related behaviors (RODRIGUES MB, et al., 2025).

Biomedical in promoting the rational use of semaglutide

Biomedical professionals can play a crucial role in identifying and monitoring adverse effects related to the use of semaglutide. Through laboratory tests, it is possible to detect early metabolic and hepatic changes that may arise because of the misuse of the medication (DUFOUR DR, et al., 2000). In addition, biomedical

professionals can contribute to health education by promoting awareness campaigns about the risks of self-medication and the importance of professional monitoring in the treatment of obesity (CONSELHO REGIONAL DE BIOMEDICINA 4A REGIÃO, 2022).

In the context of biomedicine, biomedical professionals play a fundamental role in promoting the rational use of semaglutide, since their duties include laboratory monitoring of patients using the medication, evaluating metabolic parameters and identifying adverse effects early (CONSELHO FEDERAL DE BIOMEDICINA, 2020). In addition, scientific research conducted by biomedical scientists may be essential for deepening knowledge about the long-term effects of semaglutide in different population profiles, especially in individuals without type 2 diabetes mellitus.

Collaboration between biomedical scientists and other health professionals is essential for the development of personalized therapeutic strategies. In the context of obesity treatment, for example, while the nutritionist develops dietary plans appropriate to the individual needs of patients (GUSMAO CALDEIRA, G, 2024), the pharmacist provides guidance on the correct use of medications (AL-SAMIRY AH, et al., 2024), and the biomedical scientist contributes crucial laboratory data to support clinical decisions. This integration of skills allows for a holistic approach to the patient, increasing the chances of success in the treatment of obesity.

FINAL CONSIDERATIONS

This study analyzed the impacts of the indiscriminate use of semaglutide (Ozempic®), with an emphasis on the risks associated with its use without proper medical indication, especially for aesthetic purposes and accelerated weight loss. Evidence indicates that, although semaglutide is effective in the treatment of type 2 diabetes mellitus and, more recently, obesity, its off-label use without professional supervision can trigger significant adverse effects, including gastrointestinal disorders, metabolic changes, liver complications and psychosocial repercussions. The significant role of social networks in amplifying the inappropriate use of the drug was also observed, contributing to the trivialization of risks and the growth of self-medication. This scenario highlights the urgency of stricter regulations regarding the prescription and marketing of GLP-1 receptor agonists, in addition to the need for educational campaigns to promote awareness of the dangers of improper use. The importance of the work of health professionals, especially biomedical professionals, in laboratory monitoring, clinical research and safe patient guidance is also highlighted, ensuring the rational use of semaglutide based on updated scientific evidence. It is concluded that this research contributes to a critical reflection on the conscious consumption of medicines and highlights the importance of the population's access to quality scientific information, which is fundamental for promoting health and preventing harm resulting from the irrational use of drugs.

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REFERENCES

1. ABDALQADIR NYAN, ADELI K. GLP-1 and GLP-2 Orchestrate Intestine Integrity, Gut Microbiota, and Immune System Crosstalk. Microorganisms, 2022; 1(10): 2061.
2. AHRÉN B, et al. Semaglutide induces weight loss in subjects with type 2 diabetes regardless of baseline BMI or gastrointestinal adverse events in the SUSTAIN 1 to 5 trials. Diabetes, Obesity and Metabolism, 2018; 20(9): 2210–2219.
3. AL-SAMIRY AH, et al. Proficiency and Knowledge of Community Pharmacists in the Use of Liraglutide and Semaglutide as Weight Reduction Agents. Al-Rafidain Journal of Medical Sciences, 2024; 6(1): 20–24.
4. ANDRIE EK, et al. Psychosocial Factors and Obesity in Adolescence: A Case-Control Study. Children (Basel, Switzerland), 2021; 8(4).
5. ANVISA. Canetas emagrecedoras só poderão ser vendidas com retenção da receita. 2025. Disponível em: https://www.gov.br/anvisa/pt-br/assuntos/noticias-anvisa/2025/canetas-emagrecedoras-so-poderao-ser-vendidas-com-retencao-de-receita. Acesso em: 9 jun. 2025.
6. BENDOTTI G, et al. The anti-inflammatory and immunological properties of GLP-1 Receptor Agonists. Pharmacological Research, 2022; 182: 106320.

7. BERNARDI F, et al. Comportamento de restrição alimentar e obesidade. Revista de Nutrição, 2005; 18(1): 85–93.
8. BEZERRA TPW, et al. Perigos e consequências do uso indiscriminado de ozempic no emagrecimento. Revista foco, 2024; 17(6): e5289.
9. CAMPBELL JE e DRUCKER DJ. Pharmacology, Physiology, and Mechanisms of Incretin Hormone Action. Cell Metabolism, 2013; 17(6): 819–837.
10. CAMPOS AB, et al. Implicações do uso de Semaglutida no tratamento da obesidade: uma revisão sistemática. Brazilian Journal of Health Review, 2024; 7(5): e74150.
11. CASTRO JV, et al. Análogos do GLP-1 e neuroproteção: uma revisão sistemática. Brazilian Journal of Implantology and Health Sciences, 2023; 5(4): 2727–2740.
12. CONSELHO FEDERAL DE BIOMEDICINA. Habilitações. 2020. Disponível em: https://cfbm.gov.br/habilitacao. Acesso em: 20 maio. 2025.
13. CONSELHO REGIONAL DE BIOMEDICINA 4A REGIÃO. BIOMEDICINA: Saiba tudo sobre a profissão do futuro. 2022. Disponível em: http://portal.crbm4.org.br/index.php/11-noticias/147-biomedicina-saiba-tudo-sobre-a-profissao-do-futuro. Acesso em: 6 jun. 2025.
14. COSTA ACC, et al. Efeitos da semaglutida na perda de gordura e de massa muscular. Brazilian Journal of Implantology and Health Sciences, 2018; 6(2): 2018–2035.
15. CUNHA CLP. A Influência da Obesidade e da Atividade Física no Risco Cardiovascular. Arquivos Brasileiros de Cardiologia, 2022; 119(2): 244–245.
16. DAGHER C, et al. Semaglutide-Induced Acute Pancreatitis Leading to Death After Four Years of Use. Cureus, 2024.
17. DAGHER C, et al. Semaglutide-induced acute pancreatitis leading to death after four years of use. Critical Care Medicine, 2025; 53(1).
18. DRUCKER DJ. Mechanisms of Action and Therapeutic Application of Glucagon-like Peptide-1. Cell Metabolism, 2018; 27(4): 740–756.
19. DUFOUR DR, et al. Diagnosis and Monitoring of Hepatic Injury. I. Performance Characteristics of Laboratory Tests. Clinical Chemistry, 2000; 46(12): 2027–2049.
20. GOMES HKBC e TREVISAN M. O uso do ozempic (semaglutida) como medicamento off label no tratamento da obesidade e como auxiliar na perda de peso. Revista Artigos. Com, 2021; 29: 1–7.
21. GUSMAO CALDEIRA G. Obesidade e os desafios do tratamento nutricional. Rev Saú Vales, 2024; 5(1).
22. HÆDERSDAL S, et al. The Role of Glucagon in the Pathophysiology and Treatment of Type 2 Diabetes. Mayo Clinic Proceedings, 2018; 93(2): 217–239.
23. HAN SH, et al. Practice Patterns and Perspectives of the Off-Label Use of GLP-1 Agonists for Cosmetic Weight Loss. Aesthetic Surgery Journal, 2024; 44(4).
24. HINRICHS GR, et al. The GLP-1-mediated gut-kidney cross talk in humans: mechanistic insight. American Journal of Physiology-Cell Physiology, 2024; 326(2): C567–C572.
25. HOFFMANS ADELI K. Glucagon-like peptide (GLP)-1 regulation of lipid and lipoprotein metabolism. Medical Review, 2024; 4(4): 301–311.
26. LEEHEY DJ, et al. Acute Kidney Injury Associated With Semaglutide. Kidney Med, 2021; 3(2): 282–285.
27. LEXCHIN J e MINTZES B. Semaglutide: a new drug for the treatment of obesity. Drug and Therapeutics Bulletin, 2023; 61(12): 182–188.
28. LINHARES FS, et al. Riscos potenciais relacionados ao uso indiscriminado da semaglutida. Revista JRG de Estudos Acadêmicos, 2024; 7(15): e151486.
29. LYRA R, et al. Manejo da terapia antidiabética no DM2. Diretriz da Sociedade Brasile de Diabetes, 2024.
30. MACHADO S, et al. O uso de análogos de GLP-1 liraglutida, semaglutida e tirzepatida no tratamento da obesidade: uma revisão de literatura. RECIMA21 - Revista Científica Multidisciplinar, 2023; 4(4): e442950.
31. MAHAPATRA MK, et al. Semaglutide, a glucagon like peptide-1 receptor agonist with cardiovascular benefits for management of type 2 diabetes. Reviews in Endocrine and Metabolic Disorders, 2022; 23(3): 521–539.
32. MAHMOUD AM. An Overview of Epigenetics in Obesity: The Role of Lifestyle and Therapeutic Interventions. International journal of molecular sciences, 2022; 23(3).
33. MARSO SP, et al. Liraglutide and Cardiovascular Outcomes in Type 2 Diabetes. New England Journal of Medicine, 2016; 375(4): 311–322.
34. MAYENDRARAJ A, et al. GLP-1 and GIP receptor signaling in beta cells – A review of receptor interactions and co-stimulation. Peptides, 2022; 151: 170749.
35. NAUCK MA, MEIER JJ. Incretin hormones: Their role in health and disease. Diabetes, Obesity and Metabolism, 2018; 20(S1): 5–21.
36. NOVOGRAD J et al. Semaglutide for Weight Loss: Was It Worth the Weight? Cardiology in Review, 2022; 30(6): 324–329.

37. PEREIRA LO, et al. Obesidade: hábitos nutricionais, sedentarismo e resistência à insulina. Arquivos Brasileiros de Endocrinologia & Metabologia, 2003; 47(2): 111–127.
38. PERKOVIC V, et al. Effects of Semaglutide on Chronic Kidney Disease in Patients with Type 2 Diabetes. New England Journal of Medicine, 2024; 391(2): 109–121.
39. PIMENTEL DC, et al. Eficácia e segurança da semaglutida (OZEMPIC®) no tratamento da Obesidade: uma revisão bibliográfica. Cuadernos de Educación y Desarrollo, 2023; 15(11): 13875–13893.
40. PIRES W, et al. Uso do medicamento semaglutida como aliado no tratamento da obesidade. RECIMA21 - Revista Científica Multidisciplinar, 2023; 4(2): e422731.
41. POOROLAJA LJ, et al. Behavioral factors influencing childhood obesity: a systematic review and meta-analysis. Obesity Research & Clinical Practice, 2020; 14(2): 109–118.
42. PORTO GI, et al. Impactos sistêmicos do uso off-label da semaglutida. Revista Eletrônica Acervo Científico, 2024; 47: e18999.
43. BHAGAVATHULA AS. Sweetening the deal: an infodemiological study of worldwide interest in semaglutide using Google Trends extended for health application programming interface. BMC Global and Public Health, 2024; 2(1): 63.
44. RIBEIRO WR, BOGÉA EG. Os riscos e benefícios do uso off-label da semaglutida (ozempic) para emagrecimento: uma revisão integrativa. Revista ft, 2024; 29(140): 10–11.
45. RODRIGUES MB, et al. O uso off-label da semaglutida (Ozempic®) para emagrecimento e a atenção farmacêutica na dispensação. Brazilian Journal of Health Review, 2025; 8(1): e76780.
46. RYANN, SAVULESCU J. The Ethics of Ozempic and Wegovy. Journal of Medical Ethics, 2025; jme-2024-110374.
47. SAGRATZKI RMG, et al. O risco de intoxicação pelo uso do ozempic (semaglutida) em pacientes não diabéticos. Brazilian Journal of Implantology and Health Sciences, 2023; 5(4): 1826–1837.
48. SASAKI LS, et al. Impacto do uso da semaglutida nos parâmetros cardiometabólicos de pacientes obesos não diabéticos: uma revisão sistemática. Cuadernos de Educación y Desarrollo, 2024; 16(13): e6745.
49. SHILLEH AH, et al. GLP1R and GIPR expression and signaling in pancreatic alpha cells, beta cells and delta cells. Peptides, 2024; 175: 171179.
50. SIJ, et al. The therapeutic effects and mechanisms of glucagon-like peptide-1 receptor agonists in neurocognitive disorders. Therapeutic Advances in Neurological Disorders, 2025; 18.
51. SILVA FMO, et al. Fatores ambientais associados à obesidade em população adulta de um município brasileiro de médio porte. Cadernos de Saúde Pública, 2019; 35(5).
52. SKOV J, et al. Glucagon-Like Peptide-1 (GLP-1): Effect on Kidney Hemodynamics and Renin-Angiotensin-Aldosterone System in Healthy Men. The J of Clin Endocrinology & Metabolism, 2013; 98(4): E664–E671.
53. SOUZA MVS, et al. Eficácia e mecanismos de ação da Semaglutida no controle da obesidade. Journal of Medical and Biosciences Research, 2025; 2(1): 312–322.
54. TAKIZAWAY Y, et al. Effects of A GLP-1 Receptor Agonist on Gastrointestinal Epithelial Cells. Scholars Academic Journal of Pharmacy, 2022; 11(4): 60–66.
55. TIRTHANI E, et al. Genetics and Obesity. [s.l: s.n.]. 2025.
56. TRAPPS BRIERLEYDI. Brain GLP-1 and the regulation of food intake: GLP-1 action in the brain and its implications for GLP-1 receptor agonists in obesity treatment. British Journal of Pharmacology, 2022; 179(4): 557–570.
57. ULIANA AP, et al. Os efeitos da semaglutida na perda de peso e suas aplicações em publicações da base de dados do PubMed. Revista delos, 2024; 17(62): e3198.
58. WORLD HEALTH ORGANIZATION. Obesity and Overweight. 2025. Disponível em: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight. Acesso em: 9 jun. 2025.
59. YADAV HM e JAWAHAR A. Environmental Factors and Obesity. [s.l: s.n.].
60. ZANATTA MCA, et al. A Semaglutida aplicada ao tratamento da obesidade: perspectivas clínicas na literatura. Research, Society and Development, 2023; 12(9): e10012943295.
61. ZHANG Y, et al. GLP-1 Receptor in Pancreatic α-Cells Regulates Glucagon Secretion in a Glucose-Dependent Bidirectional Manner. Diabetes, 2019; 68(1): 34–44.
62. ZHENG Z, et al. Glucagon-like peptide-1 receptor: mechanisms and advances in therapy. Signal Transduction and Targeted Therapy, 2024; 9(1): 234.