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A Shift from Diabetic Clinical Therapy to Aesthetic Use: The Ozempic Phenomenon

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Abstract

Background: Ozempic is a GLP-1 receptor agonist indicated for the treatment of T2DM. However, its effectiveness in suppressing appetite and reducing weight has led to increased off-label use by non-diabetic individuals, especially for aesthetic purposes. These changing patterns of use have raised concerns about long-term side effects, misuse, and a crisis of access to medication for diabetes patients who need it. **Purpose:** This article examines the transformation of Ozempic from a metabolic therapy drug to an aesthetic accessory, driven by the virality of social media content. This phenomenon not only triggers therapeutic exclusion for diabetic patients, but also opens ethical discussions about drug distribution, pharmaceutical commercialization, and the risks of using outside medical indications. **Method:** This study conducted a literature review of recent articles, reports, and relevant publications related to the adverse effects and distribution disparities of Ozempic. **Results:** Data shows a 594% increase in global use of GLP-1RAs between 2020 and 2023, with a 659% increase in women aged 18 - 25 and a 481% increase in men. Ozempic sales are expected to surge 26% in 2024 to $40.5 billion for Novo Nordisk, and 32% to $45 billion for Eli Lilly. This surge coincides with reports of Ozempic shortages, which have a direct impact on high-risk T2DM patients. **Conclusion**: The use of Ozempic outside of medical indications shows the need for strict regulation, balanced public education, and equitable distribution of drugs. Without intervention, this trend could worsen therapeutic exclusion and shift the function of essential drugs into aesthetic commodities.

Keywords

Ozempic, Glucagon-Like Peptide-1 Receptor Agonists, Type 2 Diabetes Mellitus, Therapeutic Exclusion, Semaglutide, Obesity

1. Introduction

Regulation of blood glucose levels and appetite is controlled by the Glucagon-like peptide-1 (GLP-1) hormone secreted by the small intestine after meals [1]. GLP-1 receptor agonists (RAs) are a class of drugs that work by mimicking the action of the endogenous GLP-1 hormone, playing an important role in the management of type 2 diabetes mellitus through stimulation of insulin secretion and inhibition of glucagon [2]. GLP-1 RAs are used as an alternative in treating type 2 diabetes. This therapy is effective in reducing plasma glucose concentrations to near normal levels, even in patients with inadequate response to oral therapy [3].

Initially, GLP-1 RAs were administered through daily injections once to twice a day. However, with the advancement of formulation technology, weekly injection forms such as semaglutide have been developed. This compound is a GLP-1 analog with up to 94% structural similarity and is available in branded preparations such as Ozempic [4]. It is administered via the subcutaneous injection route, due to its effectiveness in ensuring absorption into subcutaneous fat tissue [5]. Ozempic (semaglutide) made by Novo Nordisk is now the main therapy for T2DM with global use increasing rapidly. In Denmark alone, the prevalence of Ozempic use reached 91,626 users in 2023, reflecting a substantially increasing adoption trend [6].

Semaglutide is marketed under two major brand names: Ozempic, indicated for Type 2 Diabetes Mellitus, and Wegovy, indicated for chronic weight management in individuals with obesity. Although both contain the same active ingredient, their approved indications and dosing regimens differ. The increasing use of Ozempic for aesthetic weight reduction, despite the availability of Wegovy for obesity treatment, highlights a concerning trend of off-label medication use that blurs the boundary between medical and cosmetic applications [7].

In addition to the increase in usage rates, a Google Trends-based infodemiology analysis of the 2019-2023 period showed a sharp increase in search interest in the keywords "Ozempic" and "semaglutide" globally, indicating a growing awareness of these therapies among the public and healthcare professionals [8]. Ozempic import activity in Indonesia increased from 9536 boxes in 2021 to 153,815 boxes in 2024. A similar trend has occurred globally, with the United States also experiencing an increase in the number of semaglutide prescriptions jumping by 442% from 471,876 prescriptions to 2,555,308 prescriptions in the same period [9].

Based on Komodo Health's analysis, more than 7 million prescriptions of GLP-1 RAs were prescribed to individuals without a diagnosis of diabetes, signaling misuse and lack of use restrictions. By 2023, only 68% - 83% of Ozempic users were recorded as having a clear medical indication [5]. This phenomenon is not unique to the adult population, as in recent years there has been an increased interest in GLP-1 RAs such as semaglutide among adolescents, especially those who are overweight. This is worrisome given that adolescents are a group that is psychosocially very vulnerable to external pressures, especially regarding body image and social acceptance [10].

According to data from the World Health Organization (WHO), by 2022 more than 890 million adults are obese, and about 2.5 billion adults aged 18 years and over are overweight. This means that about 43% of adults in the world are overweight (43% of men and 44% of women). This is much higher than in 1990, when only about 25% of adults were overweight. The Southeast Asia and Africa region recorded an overweight prevalence of around 31%, while in the Americas, the figure reached 67%. In addition, about 16% of adults worldwide will be obese by 2022, and this figure has more than doubled since 1990 [11].

Body Image refers to a person's perceptions, thoughts and feelings towards their body shape, where currently many adolescents' experience Body dissatisfaction [10]. Body dissatisfaction is a negative feeling towards the body as a whole or certain parts of it [12]. This can make them more vulnerable to stress, low self-esteem, or other psychological problems. This concern tends to be more prevalent in adolescents who are going through early puberty, as there are many physical, hormonal changes that are clearly visible to themselves and those around them [10].

The main approach to tackling obesity remains lifestyle modification, such as a healthy diet and regular exercise. However, failure to follow this approach often leads individuals to extreme diets, misinformation, and the use of drugs without clear medical indications. Weight loss medications work by various mechanisms, including appetite suppression, but also have side effects that need to be watched out for. Ozempic is a clear example of how the shift in use from medical therapy to aesthetic purposes can create problems. This creates a new dilemma: therapeutic exclusion of diabetic patients who really need these drugs, due to high demand and limited supply [13].

Therapeutic exclusion refers to a situation where patients with legitimate medical indications are deprived of treatment access due to resource diversion toward non-indicated or aesthetic uses. This phenomenon needs to be studied clinically, ethically and distributionally, especially in the non-diabetic population taking semaglutide without supervision. This suggests the need to strengthen regulation, public education and evaluation of the social implications of the trend towards body perception-based medicine. In addition, collaboration between health workers, policy makers, and the wider community is key to creating responsible and sustainable drug use.

2. Method

The research method used is a literature study from PubMed, ScienceDirect, Mendeley, ResearchGate, and Google Scholar (2015-2025). The keywords we use are "Ozempic", "Type 2 Diabetes Mellitus", "GLP-1 RAs", "Semaglutide", "Therapeutic Exclusion" and "Obesity".

3. Results

3.1. Definition and Mechanism of Semaglutide

Diabetes Mellitus (DM) is a condition in which blood sugar (blood glucose) levels

increase higher than normal. DM is characterized by defective insulin secretion by pancreatic β-cells and the inability of body cells to respond to insulin causing metabolic imbalance and is classified into Type 2 Diabetes Mellitus (T2DM) [14]. According to the World Health Organization (WHO), more than 90% of diabetes cases are T2DM, with the main area of the global epidemic being Asia [15]. Based on data from the International Diabetes Federation (IDF), there were 4.2 million deaths from diabetes in 2019, with 589 million people aged 20 - 79 having diabetes in 2024 and it is expected to increase to 783.2 million by 2045 [16]. T2DM has the potential to increase morbidity and mortality as it is associated with greater insulin resistance, more rapid decline in β-cell function, and the potential for earlier and severe complications, such as coronary heart disease and stroke. To reduce the impact of T2DM, preventive measures, early diagnosis and appropriate treatment are needed [17].

The body has the hormone Glucagon-like peptide-1 (GLP-1) that will be released by the intestines after a meal to help lower blood glucose levels. GLP-1 hormone works by stimulating insulin secretion, inhibiting glucagon secretion, slowing gastric emptying, and reducing appetite through the central nervous system [18]. In the treatment of T2DM, Glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) are used which work by mimicking the GLP-1 hormone and activating its receptors. Not only that, GLP-1 RAs are also active to promote β cell proliferation and inhibit apoptosis, thus slowing the onset of T2DM [19].

3.2. Pharmacological Profile and Clinical Application of Ozempic

Semaglutide is a member of the class of GLP-1 RAs approved for the treatment of T2DM and has shown improved efficacy in glycemic control and weight loss compared to previous generation GLP-1 RAs [20]. The use of semaglutide is also associated with a reduced risk of death from cardiovascular complications, nonfatal myocardial infarction or nonfatal stroke by up to 26% compared to those not taking semaglutide [21]. Among the various semaglutide preparations, Ozempic is the most widely used globally since its approval in 2017 as a therapy for T2DM [20].

Ozempic works by a long-acting mechanism, which is through binding between semaglutide molecules and albumin. This bond will decrease renal clearance, thus protecting the drug from enzymatic metabolism and degradation. Given once a week, Ozempic has been shown to significantly reduce fasting and postprandial blood glucose levels [22]. Although proven to be effective in controlling blood glucose, the use of Ozempic in T2DM patients is not free from potential side effects that need to be considered clinically. Common side effects include nausea, vomiting and diarrhea. However, in long-term use, patients are at risk of pancreatitis, impaired renal function, and possible increased risk of thyroid tumors [23].

3.3. Epidemiological Trends and Demographics

The use of Ozempic as a T2DM therapy has undergone a significant shift in recent

years, especially when its side effect of weight loss began to be massively promoted on social media. It is important to emphasize that semaglutide, under the brand name Wegovy, is legitimately approved for chronic weight management in obese individuals. Therefore, the ethical concerns discussed in this study are not directed at medical obesity treatment itself, but at the aesthetic-driven, off-label use of Ozempic among non-diabetic users.

Not only used by diabetic patients, Ozempic is now popular among non-diabetic individuals, especially obese people, to achieve their ideal body shape. A report from IQVIA Institute in 2022 recorded an increase in semaglutide by 594% greater than the previous year. Moreover, a national pharmacy database analysis (2020-2023) showed a 659% increase in semaglutide prescriptions among females aged 18 - 25, reflecting a sharp demographic shift from therapeutic to aesthetic-driven use [24]. In 2023, there were more than 50 million prescription requests for GLP-1 Ras, with 39% of the 50 million prescriptions being requests for Ozempic [25]. Not only that, Ozempic manufacturers reported a significant surge in global sales: from $3.4 billion in 2021 to over $8.5 billion in 2023, largely driven by demand for non-medical purposes [26].

The surge in Ozempic use was triggered by viral #Ozempic content on social media, especially celebrities about its quick effects. This transformation shows how prescription drugs can shift in meaning from clinical therapy to aesthetic accessories influenced by social pressure, body image, and viral algorithms. In Indonesia, more than 1.9 billion people over the age of 18 are overweight, with 650 million of them obese. The obesity rate in Indonesia has increased by 11.3% from 2007 to 2018 [27].

Ozempic was initially developed and approved as an alternative treatment for type 2 diabetes, with initial approval in the United States, Canada, and the European Union. On December 5, 2017, the Food and Drug Administration (FDA) approved Ozempic as a T2DM treatment therapy [5]. However, over time, Ozempic has become a popular alternative for weight loss, used off-label due to the side effect of significant weight loss. Ozempic works effectively as evidenced by an average reduction of 11.85% of initial body weight [28].

As a result, the purchase of Ozempic by non-diabetics for dieting shot up sharply. This phenomenon is particularly evident in countries with wide pharmaceutical access. For example, in 2018 in Denmark, 99% of new Ozempic users were recorded as having a true indication of T2DM. However, by 2020, the proportion of new T2DM users decreased to 67% and the remaining 33% of new users did not have T2DM [6]. The same thing also happened in the United States, where in 2019, Ozempic users with a diagnosis of T2DM reached 91% and in 2022 it dropped to 63%. Studies in Sweden also highlighted the increasing misuse of GLP-1 RAs, including Ozempic for the purpose of weight management especially by higher socioeconomic status individuals. A survey was also conducted among 127 Israeli physicians with the result that 78% of physicians initiated semaglutide therapy at a dose of 0.25 mg per week for weight loss of non-diabetic patients [29].

The data of Ozempic Usage Ratio in Several Countries is shown in Table 1.

Table 1. Summary of Ozempic usage ratio in several countries.

Country	Year	Users with T2DM (%)	Users without T2DM (%)
Denmark	2019	99	1
Denmark	2022	67	33
United States	2019	91	9
United States	2022	63	15
Israel	2019	78	22

3.4. Clinical Adverse Effects and Long-Term Risks

In Indonesia, there is no epidemiologic data available on the ratio of Ozempic use by T2DM and non T2DM patients due to lack of systematic recording. Ozempic has been approved by Food and Drug Administration Authority (FDAA) of Indonesia for T2DM, but the use for weight loss has not yet received official authorization. Along with the global trend of using Ozempic, non-diabetic patients often do not pay attention to the potential side effects. The following is a specific explanation of the negative effects of using Ozempic for non-diabetic patients:

1) General Side Effects

Delayed gastric emptying keeps food in the stomach longer, which stimulates the vague nerve and postrema area in the brain, triggering 5 nausea and vomiting. In addition, increased intestinal motility leads to shorter transit times so that water absorption is impaired, resulting in loose stools or diarrhea. A slower emptying stomach can also trigger distension, excessive satiety, epigastric pain, and gas production due to fermentation of food that has not been optimally digested [30]-[32]. Furthermore, long-term safety data for semaglutide use in non-obese, non-diabetic individuals remain scarce, raising concerns about metabolic rebound and unknown chronic effects.

2) Serious Side Effects

Use of Ozempic may increase serious side effects related to gastrointestinal and hepatobiliary disorders such as acute pancreatitis and cholecystitis. Ozempic works by increasing insulin secretion by stimulating pancreatic beta cells. This overactivity causes stress to the pancreas and triggers inflammation called acute pancreatitis. Ozempic can also significantly reduce weight by extreme fasting which causes the body to go into metabolic stress mode. This allows cholesterol, bilirubin and other components to precipitate and form gallstones [33].

3) Changing Effects

The use of Ozempic with the goal of weight loss may cause the skin of the face and buttocks to sag or appear aged [34]. This is because Ozempic works by suppressing appetite and slowing gastric emptying, causing a large calorie deficit and rapid burning of fat reserves [35]. Slow weight loss gives the skin time to adjust to

the new body shape, but Ozempic makes the weight fall faster so that the skin does not have time to adapt and loose skin occurs [36]. This phenomenon called "Ozempic Face" and "Ozempic Butt" is a direct effect of the imbalance between the speed of fat loss and the skin's ability to shrink [37] [38].

4) Rebound Effect After Discontinuation

A study by Rubino et al. (2022) found that most participants lost 2/3 of their body weight within 1 year of discontinuing Ozempic. This is because the hormonal effects of Ozempic will dissipate, and users will return to feeling faster hunger with more frequency [39].

5) Psychological Effects

An analysis of 31,444 adverse event reports of semaglutide (Ozempic) use showed that out of 13,956 semaglutide users, there were 372 reports of psychiatric adverse events. Depression was the most common effect (50.3%), followed by anxiety (38.7%) and suicidal thoughts (19.6%) [40]. Healthline also interviewed Ozempic users who admitted to feeling emotionally "flat" and losing their enthusiasm for social activities. Non-diabetic users will also experience drastic changes in self-perception and the way the environment treats them [41].

Ozempic users often experience body image incongruence, which is a feeling of alienation towards one's own body after drastic weight loss. This change is often accompanied by different social treatments, where they are only valued when they are thin. This pressure can trigger panic attacks, a sense of failure, and depression, especially during the rebound effect [41] [42].

Moreover, the growing demand for Ozempic among non-diabetic users has led to limited availability for diabetic patients, encouraging unregulated distribution through unofficial online platforms. Beyond these supply issues, differences in insurance coverage and socioeconomic factors between diabetes therapy and aesthetic weight-loss use have diverted the market toward higher-paying consumers. This situation not only increases the risk of counterfeit product circulation but also worsens therapeutic inequality for patients who depend on semaglutide for glycemic control.

This suggests that side effects in non-diabetics are more severe than in diabetic patients. (**Table 2**) Given the various negative effects that can occur, concrete solutions are needed to minimize the adverse effects on users. Some approaches that can be taken include:

a) Gradual dose adjustment, i.e. starting therapy with a low dose which is then increased gradually to allow the body to adjust first and reduce the risk of gastrointestinal side effects.

b) Discontinuation of Ozempic is done by slowly decreasing the dose to prevent rapid weight gain (rebound effect) [43]. Regular checks of liver and pancreas function are also important to detect serious complications early.

c) Adopting a healthy lifestyle through a balanced diet and regular physical activity also plays an important role in improving long-term weight loss success as well as helping to reduce other side effects [44].

Table 2. Comparison of side effects of Ozempic use in diabetic and non-diabetic.

Side Effect Category	Diabetic Patient	Non-diabetic Patient
General Gastrointestinal	Nausea, vomiting, diarrhea that is generally mild to moderate in nature	Nausea, severe vomiting, abdominal pain, gastric distension, chronic diarrhea with more frequent frequency that interferes with daily activities.
Serious Side Effects	Lower risk of pancreatitis and gallstones	Acute pancreatitis and cholecystitis are more commonly reported due to extreme use of drastic caloric deficit.
Appearance Changes	Not significant, weight loss is slow so skin can adjust	Extreme subcutaneous fat loss resulting in "Ozempic Face" and "Ozempic Butt"
Rebound Effect	Controllable weight gain	Majority of weight regained within 1 year and a sense of failure, constant hunger, psychological disturbance after stopping the drug.
Psychological Effects	Generally stable due to use as indicated	Depression (50%), anxiety (38%), suicidal thoughts (19%), body identity crisis, and new social pressures
Social Interaction Disorder	Not Significant	Feeling constantly commented on about their physique so that they feel judged only because of their body shape and body image incongruence and social anxiety occur.

3.5. Therapeutic Exclusion and Regulatory Implications

However, the surge in Ozempic use did not only trigger side effects in its users. The increase in Ozempic use makes it difficult for patients with diabetes to access the medicines they need because those who are obese are also taking Ozempic [13]. This phenomenon is called therapeutic exclusion. Therapeutic exclusion is a condition where clinical patients who are entitled to or need treatment do not get the therapy they should [45]. Nondiabetic users buy Ozempic, so diabetic patients who should have difficulty finding drugs to control their blood sugar levels. External factors that cause this to happen include [46] [47]:

1) Limited drug supply due to the existing drug supply being used by non-diabetic patients.

2) Unfair or poorly targeted drug distribution.

3) Use of the drug by patients who are not in accordance with its approved indications should be discouraged until both long-term safety and supply implications are adequately characterized.

Despite its effectiveness, the high price of Ozempic has opened opportunities for the circulation of counterfeit versions. The use of adulterated Ozempic may lead to therapeutic ineffectiveness due to inappropriate dosage, contamination with harmful substances, or improper use of ingredients. This risks serious side effects, especially because Ozempic's dosage form is a subcutaneous injection that

directly enters the body system and can endanger the lives of its users.

In July 2023, WHO issued a global warning against products that include specific batch numbers. Food and Drug Administration Authority (FDAA) of Indonesia also responded to this phenomenon by issuing FDAA Regulation No. 16 of 2023 on the Supervision of the Distribution of Traditional Medicines, Quasi Medicines, and Health Supplements. This regulation authorizes FDAA to impose administrative sanctions, including cancellation/linking of distribution permit numbers, import recommendations, and/or distribution bans on business entities proven to receive, store, or distribute illegal drugs, including counterfeit products [48].

In 2020, the global phase 3 Semaglutide Treatment Effect in People with Obesity (STEP) program aimed to evaluate the efficacy and safety of semaglutide administered subcutaneously at a dose of 2.4 mg once weekly in people who are overweight or obese, with or without weight-related complications [49]. In participants with overweight or obesity, 2.4 mg of semaglutide once weekly plus a lifestyle intervention was associated with sustained and clinically relevant weight loss [50]. This means that people in great need, such as obese people who also have type 2 diabetes, should be prioritized.

Medicines regulation requires medical, scientific and technical understanding and skills, based on a solid legislative framework. However, implementing regulation is not a simple matter, as it is influenced by complex political and technical dynamics. The regulatory function requires collaboration across sectors, including manufacturers, peddlers, consumers, health workers, governments, and each researcher, with different economic, social, and political interests. Therefore, the scientific basis of regulation should be prioritized over purely administrative aspects. Every drug must meet the best quality standards and be proven safe and efficient [51].

Today's social media such as TikTok plays an important role in creating public opinion about the use of Ozempic, especially as a weight loss tool. A study analyzing 100 TikTok videos with the hashtag #Ozempic found that more than half of the content was created by individuals who are currently using or planning to use Ozempic, especially for weight loss purposes. This suggests a difference in public perception, influenced by new trends, towards the functionality and safety of using this drug [52]. Therefore, it is important to emphasize strict regulation to avoid misuse of the drug and ensure that the public understands the risks and benefits proportionally.

FDAA of Indonesia plays an important role in ensuring that drugs circulating in the community are safe and effective. The task starts before a drug is allowed to be distributed, by assessing its safety and how well it works. After a drug has received a distribution license, FDAA continues to oversee it, starting from the distribution process to monitoring if there are complaints or side effects from users. Through the drug side effect reporting system (pharmacovigilance), FDAA can detect early potential health risks from inappropriate drug use [53].

Meanwhile, WHO's role is to set global standards for the quality, safety, and effectiveness of medicines. Through programs such as WHO Prequalification and the Global Benchmarking Tool (GBT), WHO helps countries to strengthen their regulatory capacity, as well as ensure that drugs used including those used in global health programs have undergone transparent and scientific assessment [54]. Thus, the synergy between national oversight by NA-DFC and global standards from WHO is crucial not only to ensure drug safety and effectiveness, but also to prevent therapeutic exclusion - a condition where certain groups are denied access to appropriate therapies due to regulatory, distributional, or economic inequalities.

4. Conclusion

Originally developed for T2DM therapy, Ozempic is now widely used by non-diabetic individuals for weight loss. This shift has caused negative impacts, such as serious medical side effects (nausea, vomiting, diarrhea, abdominal pain), rebound, and psychological disturbances. The surge in demand also triggers scarcity for diabetic patients. Strict regulation, comprehensive public education, and a multidisciplinary approach are needed to keep the use of Ozempic safe, targeted, and equitable, especially to prevent inequality of access due to regulation, distribution, or economic barriers.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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