ORIGINAL ARTICLE

The Prevalence Regarding the Use of Glucagon-like Peptide-1 (GLP-1) Agonists as an Obesity Treatment among Adult Patients at King Abdulaziz University Medical Services Center, Jeddah, Saudi Arabia: A Descriptive Cross-Sectional Study

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Keywords
Glucagon-like Peptide-1 agonists, Obesity treatment, Adult patients, King Abdulaziz University Medical Services Center, Jeddah, Cross-sectional study

Abstract
Background: Glucagon-like peptide-1 (GLP-1) receptor agonists effectively achieve and sustain body weight reduction in individuals with obesity. However, there are few studies on the safety and tolerability of GLP-1 agonists in the Saudi Arabian population with obesity.
Objectives: To assess the prevalence of GLP-1 agonists used for obesity treatment and the associated adverse effects among adult populations at King Abdulaziz University Medical Services Center, Saudi Arabia.
Methods: A cross-sectional study was conducted at King Abdulaziz University Medical Services Center with 188 participants, all above 18 years of age with Body Mass Index (BMI) ≥ 27, using GLP-1 agonists. A validated questionnaire was used to collect data on participants' demographics, chronic diseases, smoking habits, weight, height, family support for weight loss, cause of obesity, weight loss attempts, GLP-1 agonist usage patterns, negative side effects of GLP-1 agonist use, and patient satisfaction.
Results: The mean age of participants was 46.24 ± 12.78 years, with 56.9% being male and 85.6% of Saudi nationality. The mean BMI was 34.78 ± 5.3 kg/m^2, and 80.9% were classified as obese. Semaglutide was the most commonly used GLP-1 agonist (66%). For 86.2% of participants, the medication was prescribed by a physician, with a mean medication use duration of 12.43 ± 14.73 months. The mean weight loss during treatment was 10.11 ± 6.53 kg, and 70.2% had negative side effects with nausea (51.1%) being the most common. Of the participants, 65.5% were satisfied with the GLP-1 therapy outcome and 78.7% would recommend its use to others. The incidence of adverse effects was significantly higher among those using GLP-1 agonists for diabetes and weight reduction.
Conclusion: GLP-1 receptor agonists are promising agents for obesity treatment, with a mean weight loss of approximately 10 kg among participants. Despite the side effects, most patients were satisfied with the drug and would recommend its use to others.

INTRODUCTION

Saudi Arabia has experienced increasing westernization over the past few decades, leading to a surge in obesity and overweight cases. According to estimations by the World Health Organization (WHO), the Kingdom of Saudi Arabia (KSA) has an overall obesity prevalence of 33.7% and an overweight prevalence of 68.2%. The high prevalence of obesity in Saudi society suggests that preventive efforts are either lacking or ineffective[1].

Being overweight or obese is a biological risk factor for several significant health disorders including diabetes, hypertension, and cardiovascular diseases. In addition, being overweight has a negative impact on a person's physical and mental health, lifestyle, and finances due to reduced productivity, increased disability, higher healthcare costs, and shorter life spans[2].

This challenge needs to be resolved as Saudi Arabia is undergoing a significant economic transition as part of Vision 2030 to boost the nation's human capital, guarantee quicker economic growth, and build a workforce that is healthy and prepared for a productive future[2].

A class of medications known as glucagon-like peptide-1 (GLP-1) agonists are used to treat persons with type 2 diabetes[3]. The medications in this class include exenatide, lixisenatide, liraglutide, albiglutide, dulaglutide, and semaglutide. According to the American Diabetes Association, while metformin remains the primary treatment for type 2 diabetes, GLP-1 agonists are recommended for patients with chronic renal disease, atherosclerosis, heart failure, or elevated hemoglobin A1C (HbA1C) levels, 1.5% or higher[3].

The FDA has approved semaglutide and high-dose liraglutide as pharmacological therapies for obesity; patients who are overweight and have concurrent health issues may be urged to use these drugs[3]. These drugs are currently under assessment for their potential to reduce the incidence of obesity. Moreover, semaglutide does not require dose adjustments and is safe for use in adults and older individuals with hepatic or renal impairments[4].

GLP-1 receptor agonists reduce hunger and appetite, increase feelings of fullness after meals, and delay stomach emptying. The most common adverse effects of the medication are nausea, vomiting, and diarrhea, which often start within the first few weeks of treatment and subsequently subside[5].

According to a study by Ard et al. (2021), GLP-1 receptor agonists are a highly effective and well-tolerated form of treatment that can help individuals with obesity achieve and sustain 5–10% body weight reductions[5].

Barritt AS 4th, et al. (2022) showed that liraglutide and semaglutide, two GLP-1 receptor agonists, were associated with a clinically substantial and long-lasting reduction in body weight in individuals who were overweight or obese[6]. The same effectiveness of semaglutide was observed in a previous double-blind, randomized controlled trial, where the mean change in body weight from baseline to week 68 was -14.9%[7].

Liraglutide users often lose 4–7 kg after taking the medication. Semaglutide has a more pronounced effect on weight loss, resulting in a mean weight reduction of 9–16 kg. These outcomes have contributed to the regulatory approval of these medications for treating obesity, even in non-diabetic individuals[8].

According to the Saudi Arabian Society for Metabolic and Bariatric Surgery (SASMBS) guidelines, GLP-1 agonists, including liraglutide, can be used to treat obesity and reduce the number of morbidly obese individuals in Saudi Arabia[9]. In addition, GLP-1 agonists are a great substitute for invasive procedures such as liposuction and bariatric surgery[10,11].

However, there are few studies on the safety and tolerability of GLP-1 agonists in the Saudi Arabian population with obesity. Thus, this study aimed to assess the prevalence of GLP-1 agonists used for obesity treatment and their associated adverse effects among the adult population in Jeddah, Saudi Arabia.

SUBJECTS AND METHODS

Study design, setting, and timeline: This cross-sectional study was conducted at King Abdulaziz University Medical Services Center, Jeddah, Saudi Arabia, from January 2023 to April 2024.

Study participants: The study included adults in Jeddah who were above 18 years old, with a BMI of 27 kg/m^2 or above, who were using GLP-1 agonists for weight loss, and who were willing to participate.

Participants under 18 years, pregnant women, and adults unwilling to provide informed consent were excluded.

Sample size: A total coverage sample of approximately 188 individuals was obtained during the study period, and all adults who met the inclusion criteria were included. A total of 873 patients who had received the medication were contacted; however, we excluded 685 patients, of whom 550 did not respond to either WhatsApp or phone calls, 31 refused to participate in the study, and 60 had an incorrect phone number as a result of incorrect documentation or had a BMI below 27 kg/m^2. Patients under 18 years were excluded from the study.

Data collection: Data were collected through phone calls and face-to-face surveys (Google Forms). To our knowledge there was no validated questionnaire relevant to our study; therefore, we administered our own questionnaire, which contained a number of multiple-choice questions in both English and Arabic. All questions were designed to assess the prevalence of GLP-1 agonists used for obesity treatment among adults in Jeddah. The questionnaire was designed to collect personal data by asking about sex, age, nationality, marital status, occupation, monthly income, weight, height, obesity causes, chronic diseases, and smoking status.

The questionnaire included questions to assess family support regarding the participants' efforts to lose weight, unsuccessful previous weight loss attempts, the name of the drug that they took for weight loss and the reason for its use, who recommended the medication when they started using this medication, duration of drug use, administration methods, frequency, and number of kilograms lost during the treatment period. Moreover, it included questions assessing the negative effects of taking these medications for weight loss, medication type, and patient satisfaction with the results.

The research instrument was validated by a medical expert through a pilot study involving 20 participants (patients who take GLP-1 in King Abdulaziz University Medical Services Center, Jeddah, Saudi Arabia). Data were transferred to an Excel sheet to share with the expert; then, data was coded using SPSS. The evaluation considered the clarity of the questions, the time required to answer the questions, and alignment with study objectives; the questionnaire was then modified accordingly. Cronbach's alpha value for assessing reliability was 8.3%.

Ethical considerations: Ethical approval for the study was obtained from the Research Ethics Committee of King Abdulaziz University Medical Services Center, Jeddah, Saudi Arabia. Informed consent was obtained from all participants before their participation in the study. The participants were provided with detailed information regarding the purpose of the study.

To ensure confidentiality, we did not use the participants' names; instead, we assigned unique codes to each participant. This coding system allowed us to collect and analyze data without revealing any identifying information. Data were securely stored in password-protected files accessible only to authorized research personnel.

Data analysis: Statistical analysis was performed using the SPSS application version 26. To investigate the association between the variables, the Chi-square test ($\chi 2$) was used to analyze qualitative data expressed as numbers and percentages. Quantitative variables were expressed as mean ± standard deviation (Mean ± SD). Multivariate logistic regression analysis was performed to assess factors associated with the development of negative effects from weight loss medications. Odds ratio (OR) with a 95% confidence interval (CI) was calculated, and a *p*-value of < 0.05 was considered statistically significant.

RESULTS

The mean BMI of the study participants was 34.78 ± 5.3; of these, 36 (19.1%) were classified as overweight, and 152 (80.9%) as obese. The mean age was 46.24 ± 12.78 years, 56.9% were males, 85.6% held Saudi nationality, and 79.3% were married. In addition, 67.6% were employed, and 28.1% had a monthly income of 10,000 - 19,999 SAR. Forty-two percent of the participants had chronic diseases, with diabetes and hypertension being the most common (58% and 41.5%, respectively). Approximately 26% (26.1%) were current smokers (Table 1).

The majority (84.6%) received support from family members for their weight-loss efforts. The most common causes of obesity were lack of exercise (71.8%) and overeating (52.7%). Approximately 72% (72.9%) had previous unsuccessful weight loss attempts, with diet (65.4%) and exercise (42%) being the most common

Table 1. Distribution of study participants according to their demographic characteristics, chronic diseases, and smoking status (No.: 188).

Variable	No. (%)
Age (Mean ± SD) (years)	46.24 ± 12.78
Gender	
Female	81 (43.1)
Male	107 (56.9)
Nationality	
Non-Saudi	27 (14.4)
Saudi	161 (85.6)
Marital status	
Divorced	10 (5.3)
Married	149 (79.3)
Single	24 (12.8)
Widow	5 (2.7)
Occupation	
Employed	127 (67.6)
Retired	29 (15.4)
Student	13 (6.9)
Unemployed	19 (10.1)
Monthly income	
less than 4000	18 (9.6)
4000-9,999 SAR	17 (9)
10,000-14,999 SAR	36 (19.1)
15,000-19,999 SAR	17 (9)
More than 20,000 SAR	16 (8.5)
I don't have monthly income	17 (9)
I prefer not to answer	67 (35.6)
Do you have any chronic diseases?	
No	109 (58)
Yes	79 (42)
If having a chronic disease, specify:	
Diabetes mellitus (DM)	109 (58)
Hypertension (HT)	78 (41.5)
Thyroid disease	28 (14.9)
Respiratory disease	17 (9)
Migraine or tension headaches	10 (5.3)
Gastrointestinal diseases	22 (11.7)
Cardiac disease	20 (10.6)
Kidney diseases	2 (1.1)
Neurological diseases	9 (4.6)
Anxiety, depression, or any psychological diseases	15 (8)
Others	19 (10.1)
Do you smoke?	
No	121 (64.4)
Ex-smoker	18 (9.6)
Yes	49 (26.1)

SD: standard deviation

methods used to lose weight. The most commonly used GLP-1 agonists were semaglutide (Ozempic or Rybelsus) (66%) and liraglutide (Victoza or Saxenda) (39.4%). More than half (54.8%) of the participants used the medications for both diabetes and weight reduction, and 86.2% reported that a physician made the recommendation. The mean duration of medication use was 12.43 ± 14.73 months. Most participants used injectable forms of the medication, with 60.1% taking it once a week. The mean number of kilograms the participants lost during the treatment period was 10.11 ± 6.53 kg (Table 2).

Table 2. Distribution of study participants based on obesity-related circumstances (No.: 188)

Variable	No. (%)
Do your family members encourage your efforts to lose weight?	
No	29 (15.4)
Yes	159 (84.6)
Cause of obesity	
Lack of exercise	135 (71.8)
Overeating	99 (52.7)
Pregnancy	27 (14.4)
Medications (e.g., cortisone)	19 (10.1)
Psychological factors	43 (22.9)
Others	59 (31.4)
Are there previous weight loss attempts that were unsuccessful?	
No	51 (27.1)
Yes	137 (72.9)
If you have previous weight loss attempts, specify:	
Diet	123 (65.4)
Exercise	79 (42)

Table 2. Distribution of study participants based on obesity-related circumstances (No.: 188).–Continuation

Medication	46 (24.5)
Surgery	9 (4.8)
What is the name of the drug that you take for weight loss?	
Semaglutide (Ozempic or Rybelsus	124 (66)
Liraglutide (Victoza or Saxenda)]	74 (39.4)
Dulaglutide (Trulicity)]	4 (2.1)
Exenatide (Bydureon)]	1 (0.5)
Lixisenatide (Adlyxin)]	1 (0.5)
Tirzepatide(Mounjaro)	3 (1.6)
Why are you using this medication?	
Diabetes and weight reduction	103 (54.8)
Weight reduction	80 (42.6)
Other	5 (2.7)
Who made the medication recommendation?	
Someone on social media	7 (3.7)
Your family	8 (4.3)
Your friends	11 (5.9)
Your physician	162 (86.2)
When did you start using this medication? (Mean ± SD) (Months)	12.43 ± 14.73
Select the administration methods	
Injection	182 (96.8)
Oral	6 (3.2)
How frequently do you use this medication?	
Once daily	70 (37.2)
Twice daily	2 (1.1)
Once weekly	113 (60.1)
Other	3 (1.6)
How many kilograms did you lose during the treatment period? (Mean ± SD) (kg)	10.11 ± 6.53

SD: standard deviation

Figures 1 and 2, and Table 3 illustrate that most participants (70.2%) experienced negative side effects from using the medication, with nausea (51.1%), anorexia (47.9%), and constipation (31.9%) being the most common. For most participants (55.3%), the doctor decided to continue at the same dose regarding the side effects. While most of them (75%) had regular follow-ups with their doctor, only 22.9% followed up with a dietitian regularly. Approximately 78% (78.7%) would recommend GLP-1 agonists to others.

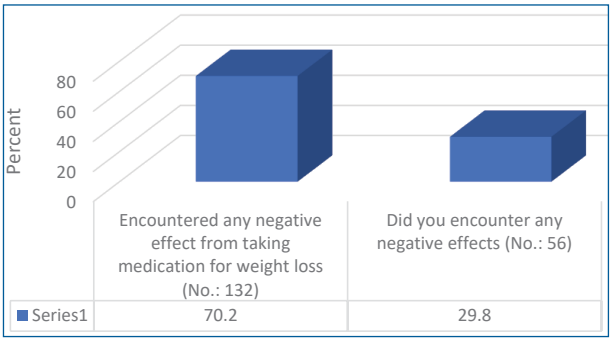


Figure 1. Percentage distribution of the participants according to their encounter of negative effects from weight loss medications (No.: 188).

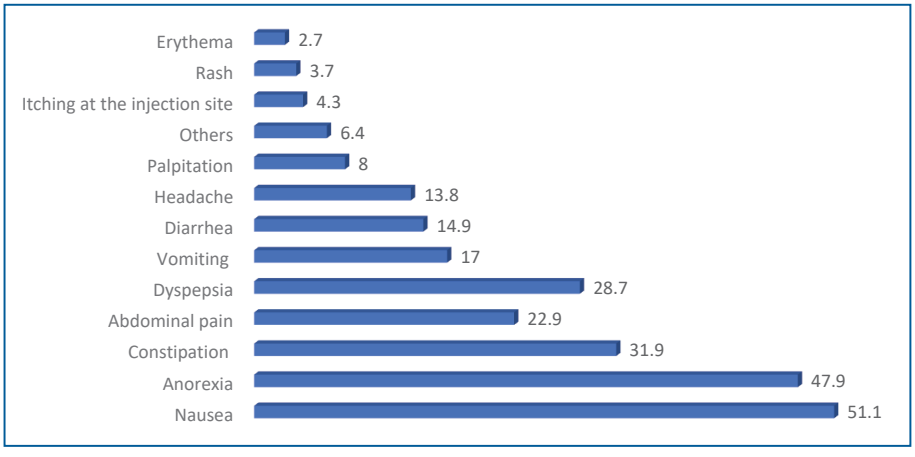


Figure 2. Percentage distribution of the negative effects of weight loss medications (No.: 132)

Table 3. Distribution of participants according to the negative effects of using weight loss medications, regular follow-up with the doctor or dietician regularly, and recommendation of GLP-1 use to others (No.: 188)

Variable	No. (%)
Did you encounter any negative effects from taking medication for weight loss?	
No	56 (29.8)
Yes	132 (70.2)
Mention what was the symptom?	
Anorexia	90 (47.9)
Nausea	96 (51.1)
Dyspepsia	54 (28.7)
Vomiting	32 (17)
Diarrhea	28 (14.9)
Constipation	60 (31.9)
Abdominal pain	43 (22.9)
Palpitation	15 (8)
Rash	7 (3.7)
Erythema	5 (2.7)
Itching at the injection site	8 (4.3)
Headache	26 (13.8)
Others	12 (6.4)
What is a doctor's decision regarding the side effects?	
NA	30 (16)
Change the dose	15 (8)
Complete at the same dose	104 (55.3)
Stop using this medication for some weeks	14 (7.4)
Other	25 (13.3)
Do you follow up with the doctor regularly?	
No	47 (25)
Yes	141 (75)
Do you follow up with a dietitian regularly?	
No	145 (77.1)
Yes	43 (22.9)
Do you recommend others to use GLP-1?	
No	40 (21.3)
Yes	148 (78.7)

Regarding participants' satisfaction with the GLP-1 medication outcome, almost one-third (65.5%) of the participants were satisfied (Figure 3).

Table 4 and Figure 4 show that negative side effects were significantly more common among participants using the medication for both diabetes and weight reduction ($p = < 0.05$). On the other hand, a non-significant relationship was found between developing negative effects and using the drugs, medication duration, who made the medication recommendation, or administration route/frequency ($p > 0.05$).

Multivariate logistic regression analysis assessed the risk factors (independent predictors) for developing negative side effects among the study participants. The analysis observed that none of the studied variables were risk factors (independent predictors) for developing negative effects from the medication ($p > 0.05$) (Table 5).

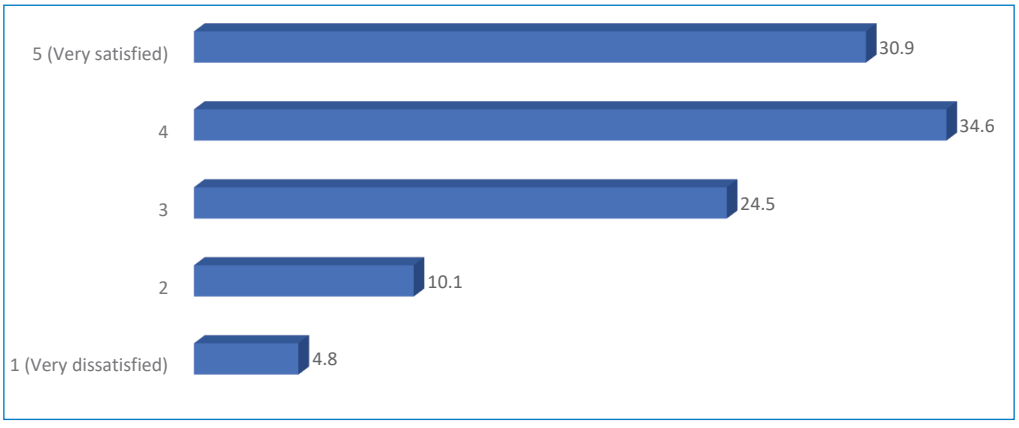


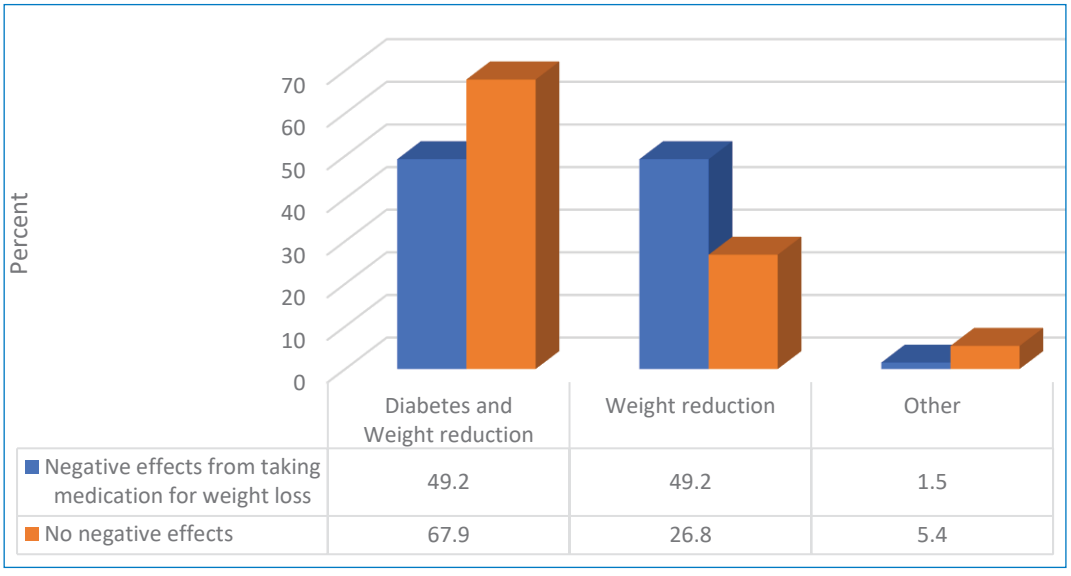
Figure 3. Percentage distribution of the participants' rating (from 1-5) of their satisfaction with the GLP-1 medication outcome (No.: 188)

Table 4. Relationship between developing negative effects from weight loss medications and factors such as medication use, reason for use, duration, source of recommendation, administration route, and frequency (No.: 188)

Variable	Encountered any negative effects from taking medication for weight loss		$\chi 2$	*p*-value
	No	Yes		
	No. (%)	No. (%)		
What is the name of the drug that you take for weight loss?				
Semaglutide (Ozempic or Rybelsus	40 (71.4)	84 (63.6)	1.06	0.302
Liraglutide (Victoza or Saxenda)]	19 (33.9)	55 (41.7)	0.98	0.321
Dulaglutide (Trulicity)]	2 (3.6)	2 (1.5)	0.79	0.372
Exenatide (Bydureon)]	0 (0.0)	1 (0.8)	0.42	0.514
Lixisenatide (Adlyxin)]	0 (0.0)	1 (0.8)	0.42	0.514
Tirzepatide(Mounjaro)	1 (1.8)	2 (1.5)	0.01	0.892
Why are you using this medication?				
Diabetes and Weight reduction	38 (67.9)	65 (49.2)	9.32	0.009
Weight reduction	15 (26.8)	65 (49.2)		
Other	3 (5.4)	2 (1.5)		
Who made the medication recommendation?				
Someone on social media	3 (5.4)	4 (3)	1.94	0.584
Your family	1 (1.8)	7 (5.3)		
Your friends	4 (7.1)	7 (5.3)		
Your physician	48 (85.7)	114 (85.4)		
When did you start using this medication? (Mean ± SD) (Months)	15.18 ± 18.2	11.24 1± 2.86	1.56	1.45
Select the administration methods?	53 (94.6)	129 (97.7)	1.21	0.271
Injection	3 (5.4)	3 (2.3)		
Oral				
How frequently do you use this medication?				
Once daily	18 (32.1)	52 (39.4)	2.97	0.396
Twice daily	1 (1.8)	1 (0.8)		
Once weekly	35 (62.5)	78 (59.1)		
Other	2 (3.6)	1 (0.8)		

Table 5. Multivariate logistic regression analysis of risk factors associated with developing negative effects from weight loss medications

Variable	B	Wald	*p*-value	Odds Ratio (CI:95%)
What is the name of the drug that you take for weight loss?				
Semaglutide (Ozempic or Rybelsus	0.14	0.04	0.834	0.86 (0.21-3.46)
Liraglutide (Victoza or Saxenda)]	0.23	0.17	0.675	0.27 (0.41-1.34)
Dulaglutide (Trulicity)]	0.35	0.08	0.778	0.42 (0.12-1.98)
Exenatide (Bydureon)]	0.15	1.08	0.265	0.16 (0.34-1.65)
Lixisenatide (Adlyxin)]	0.17	0.13	0.176	0.54 (0.13-1.99)
Tirzepatide(Mounjaro)	0.67	1.09	0.451	0.61 (0.91-2.67)
Why are you using this medication?	0.83	3.04	0.081	2.29 (0.9-5.84)
Who made the medication recommendation?	0.18	0.57	0.448	1.2 (0.74-1.97)
When did you start using this medication? (Mean ± SD) (Months)	0.01	1.14	0.285	0.98 (0.96-1.01)
Administration methods	0.67	0.18	0.63	0.96 (0.18-1.39)
How frequently do you use this medication?	0.16	0.23	0.63	1.17 (0.6-2.28)



N.B.: ($\chi 2 = 32$, p-value = 0.009)

Figure 4. Relationship between developing negative effects from medication use and the reason for medication use (No.: 188)

DISCUSSION

This study aimed to determine the prevalence of GLP-1 agonist use for obesity treatment among patients at King Abdulaziz University Medical Services Center in Saudi Arabia and its associated adverse effects.

A multimodal approach to obesity treatment was essential for patients because obesity is considered a chronic and relapsing disease. Anti-obesity drugs are valuable therapeutic agents for managing

obesity[2,3]. Our findings shed light on the importance of participants' health and demographic traits. Among the study population, 19.1% were classified as overweight and 80.9% as obese. These results indicated a considerable burden of excess weight in the group under investigation.

The mechanism of action of GLP-1 agonists and their receptor activity, particularly their non-glycemic effects, and advantages in treating comorbidities associated with insulin resistance, were the rationale behind their use for obesity[12,3]. They play a major role in weight reduction through their effects on gastric emptying time, suppression of inappropriate post-meal glucagon increase, and reduction of food intake, which are part of their non-glycemic effects[14,15].

The sex distribution of the sample revealed a slight male predominance (56.9%). Furthermore, most participants (85.6%) were Saudi nationals, representing a typical sample of the local population in the country, and 79.3% reported being married. This study revealed that women are more likely than men to be overweight or obese, consistent with a recent review that reported that women in Saudi Arabia are more likely to develop obesity in their middle and older years, which conforms to the study participants' average age[16]. Our results are consistent with earlier studies showing that married people may be more prone to weight gain for various reasons, including lifestyle changes and increased responsibilities[17,18].

Of the participants, 67.6% were employed. This indicates that a significant portion of the research population worked regularly, which may have influenced their overall well-being. Moreover, 28.1% of the participants had monthly incomes ranging from 10,000 to 19,999 SAR. As it falls between the middle and upper-middle classes, this income range suggests that a wide range of socioeconomic backgrounds were included in the study. Additionally, 42% reported having at least one chronic illness; 58% and 41.5% had diabetes and hypertension, respectively. These findings emphasize the importance of treating obesity as a risk factor for the onset of other chronic diseases as well as an isolated health issue, as numerous studies have shown a clear correlation between obesity and other chronic diseases[17,19].

Approximately, 26.1% of the participants were smokers; given that smoking is linked to many harmful health outcomes, such as an increased risk of cardiovascular disease and several types of cancer, its prevalence is a cause for concern. The correlation between smoking, obesity, and the risk of becoming overweight highlights the need for multifaceted therapies that address several risk factors simultaneously[20,21].

GLP-1 receptor agonists are thought to have an impact on weight loss by modulating hunger and satiety. In our study, semaglutide (Ozempic) (66%) and liraglutide (Saxenda) (39.4%) were the two most utilized GLP-1 agonists. Among these individuals, over half (54.8%) were taking the medications for both weight loss and diabetes. The average duration of the drug use was 12.43 ± 14.73 months, with 61% receiving the medication once a week via injection. Over the course of the treatment, the patients lost 10.11 ± 6.53 kg on average. In accordance with a prior study, the greatest mean changes in body weight with liraglutide 3.0 mg were -6.5 kg (95% CI: -7.4 to -5.5; $p < .001$) at 6 months of treatment[22]. Additionally, our findings align with previous studies that reported 4.4 kg of weight loss on average at 4 months, 7.0 kg at 4 months, and 6.4 kg at 3 months for participants in trials conducted in Switzerland, Canada, and Spain, respectively[23,24,25]. These findings suggest that the effects of GLP-1 receptor agonists on weight loss may differ, possibly due to the different homologies and administration frequencies of medications[26]. These findings are consistent with those of previous studies.

According to our results, most patients who used GLP-1 receptor agonists experienced gastrointestinal side effects, the most frequent being nausea (51.1%), anorexia (47.9%), and constipation (31.9%). Despite these adverse effects, patient adherence to the medication was unaffected, and for 55.3% of participants, the doctor decided to keep the patients on the same dosage despite the negative effects. The medications with the highest rates of adverse side effects were semaglutide (63.6%) and liraglutide (41.7%). Additionally, individuals without diabetes who were obese were more likely to experience adverse outcomes. According to an Indian study, stomach issues were the most frequently reported adverse effects. Exenatide and liraglutide were the two medications with the highest adverse effects[27]. According to another Saudi Arabian study, gastrointestinal antagonistic episodes rank among the most frequently reported side effects of semaglutide use[28].

Regarding managing side effects, a multidisciplinary consensus states that to prevent or at least lessen gastrointestinal side effects, patients must be educated about possible side effects and taught how to adhere to a set of rules. Healthcare professionals must understand that the best way to reduce the gastrointestinal side effects of GLP-1 receptor agonists is to provide thorough dietary education, flexibility during the dose escalation phase, and appropriate symptomatic treatment of persistent gastrointestinal adverse events[29]. Therefore, we encourage doctors to counsel patients about potential gastrointestinal side effects that may arise during treatment, refer them to gastroenterologists when necessary, and advise patients to follow up with dietitians regularly to develop a diet that is appropriate for them in the process of optimizing their health to maintain their quality of life and manage common adverse events.

The study findings provide insights into how patients perceive injectable treatment options. Several factors, such as dose frequency, convenience of use of the injection, and ease of administration, influence patient satisfaction.

Our findings align with previous research indicating that patients prefer medication profiles that involve single-use injections, once-weekly rather than once-daily dosing, which were linked to better glycemic control, less weight gain, and fewer adverse events in discrete choice experiments[30].

According to the current study, over one-third (30.9%) of participants reported being satisfied with their GLP-1 treatment, primarily due to diabetes control, weight loss, and minimal side effects from the medication. Furthermore, 78.7% of participants indicated how much they benefited from GLP-1, saying that they would recommend it to others. Other trials have reported a high patient satisfaction rate with GLP-1 medication, likely due to its association with decreased HbA1C levels and weight reduction[31, 32].

Using the Treatment Satisfaction Questionnaire for Medication (TSQM-9), which scores by domain and each domain scores range from 0 to 100, a previous cohort study discovered a high treatment satisfaction rate, with global satisfaction growing from 47.95 to 69.38 and efficacy climbing from baseline to 71.34. However, there was no difference in drug convenience between 69.06 and 71.34. As a result, they proposed that although liraglutide therapy increases treatment satisfaction and achieves a high adherence rate, once-daily subcutaneous injection of liraglutide did not improve convenience[32].

Hence, perceptions and preferences are important factors in adherence that affect the practical efficacy of GLP-1 receptor agonists.

LIMITATIONS

The limitations of our study include the fact that it was conducted at a single center in Jeddah, Saudi Arabia; therefore, it is difficult to generalize our findings to the entire Saudi Arabian population. As 685 patients of those who received the medication were excluded due to various reasons (non-response, refusing to share in the study, having a wrong phone number due to incorrect documentation; having a BMI < 27 kg/m^2 or aged < 18 years), future national multi-center studies in larger samples are encouraged to confirm the concluded results.

In addition, we could not access certain important laboratory results, such as HbA1C levels in patients with diabetes and lipid profiles, which may have added valuable information to our findings. Furthermore, the recurrent unavailability of the medications throughout the study period may have affected the efficacy of the treatment and the overall outcome of the study. Moreover, the use of a self-administered questionnaire may have introduced recall bias. Another limitation is that the study included participants with varying durations of GLP-1 agonist use, ranging from less than a month to over a year. This broad variability could significantly impact the interpretation of weight loss outcomes and adverse effects. Future studies should consider subgroup analyses based on the duration of medication use to offer more precise insights into the relationship between treatment duration and its effects. While this study recognizes that research on GLP-1 agonist use has been conducted worldwide, it is essential to note that this topic is still relatively new in Saudi Arabia. Although our findings may align with existing literature, examining GLP-1 agonist use in the Saudi population offers valuable insights that are currently absent from regional studies. This study serves as a foundational step toward understanding the implications and effectiveness of GLP-1 therapy within a local context. Future studies could build on these findings by investigating cultural and healthcare

factors specific to Saudi Arabia that may influence GLP-1 agonist use, enhancing the novelty and relevance of research in this emerging field.

CONCLUSION

According to this study, the two GLP-1 agonists most frequently prescribed are semaglutide and liraglutide, both of which have been shown to significantly reduce body weight during treatment. The most frequently reported side effects were nausea, anorexia, and gastrointestinal issues, particularly in non-diabetic individuals with obesity. Despite these issues, a sizable percentage of the participants reported being extremely happy with the results of their treatment and were willing to recommend GLP-1 therapy to others. Furthermore, future longitudinal studies with larger sample sizes and multi-center randomized controlled trials are required to generalize the effectiveness of GLP-1 agonists in the Saudi population. GLP-1 agonists should be used as adjuncts to lifestyle modifications. Given the limited long-term safety and efficacy data, cautious monitoring and further research in this area are required.

CONFLICT OF INTEREST

The authors declared that there is no conflict of interest that is related to this study and this article.

DISCLOSURE

The authors did not receive any form of commercial support, including compensation or financial assistance, for this case report. Additionally, the authors have no financial interest in any of the products, devices, or drugs mentioned in this article.

ETHICAL APPROVAL

Ethical approval was obtained from the Research Ethics Committee of King Abdulaziz University Medical Services Center, Jeddah, Saudi Arabia.

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