Usage and Perception of New Parenteral Medications for Weight Loss in Saudi Arabia

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ABSTRACT

The rising prevalence of obesity in Saudi Arabia has driven interest in novel pharmacological treatments, particularly glucagon-like peptide-1 receptor agonists (GLP-1 RAs) such as semaglutide and tirzepatide. These parenteral medications have demonstrated significant efficacy in weight reduction and metabolic improvement. However, their adoption, perception, and real-world utilization among patients and healthcare providers in Saudi Arabia remain underexplored. This study assessed the usage patterns, awareness, and perception of semaglutide and tirzepatide for weight loss among healthcare professionals and individuals seeking obesity management. We conducted a cross-sectional survey to assess the perception and usage of the new parenteral weight loss medications in Saudi Arabia. We used an online questionnaire in Google Survey Form to collect data. The data collected was analyzed using Microsoft Excel and IBM's Statistical Package for Social Sciences (SPSS). Most participants have not been previously diagnosed with obesity: 347 (66.9%), while 138 (26.6%) have been previously diagnosed. Most respondents indicated interest in losing weight 429 (82.8%). Most respondents to the items related to knowledge of these medications have obtained them through prescriptions 70 (62.5%) and are aware of the side effects, how to use them, and the need for expert counseling before usage. We found evidence of an association between interest in losing weight and age [X^2 (3, N = 518) = 25.3, p < 0.001]. We also found a relationship between gender and participants' interest in losing weight (P<0.001). We found that gender is a predictor and that females have 74% lower odds of being previously diagnosed with overweight/obesity (aOR 0.28; 95% [CI], 0.15-0.53; p<0.001). Our study demonstrated that nationality predicts awareness of the new weight loss medications, and non-Saudis have 3% lower odds of knowing or being aware of semaglutide and tirzepatide (aOR 0.89; 95% [CI], 0.618-1294; p=0.005). In conclusion, our study found that respondents have a strong interest and willingness to manage their weight using weight medications (semaglutide or tirzepatide). This will have a significant impact on the future management of obesity in many aspects, such as guiding healthcare policies, pharmaceutical development, healthcare practices, public health campaigns, and research initiatives.

INTRODUCTION

The World Health Organization (WHO) and the Saudi Arabian Ministry of Health define overweight or obesity as an abnormal or excessive fat accumulation that can lead to a variety of health risks, especially cardiovascular issues[1,2]. Obesity is a complex disease influenced by a variety of factors, including genetics that increases hunger and food intake, as well as environment and behaviour, such as a high-calorie diet, limited intake of fruits and vegetables, a lack of sleep, and stress, all of which are associated with increased appetite by altering hormonal regulation of appetite and metabolism[2,3]. Other variables, such as the bacterial gut microbiome, can contribute to weight gain, as can social determinants of health, including poverty, educational levels, and community design[3]. The leading cause of weight gain and obesity is the imbalance between the calories a person takes and the extent of physical activity, where the excess energy is stored as fat, leading to weight gain and potential obesity[1,2,4]. Body Mass Index (BMI) is a universal means of assessing whether weight or body fat is higher than what is considered a healthy weight for a given height and is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m^2)[2]. A person is considered overweight when the BMI is over 25, while a person is considered obese when the BMI is 30[2]. The prevalence of overweight and obesity has become a global issue, with a high rate of prevalence in both developing and developed countries in all age groups & genders, and it has doubled in the last three decades[4,5]. The World Health Organisation has reported that more than 1.9 billion adults were overweight in 2016; among them, 650 million were obese[2]. Causes of overweight and obesity include genetic and lifestyle factors such as diet and physical activity. However, genetic factors include parental obesity, underlying disease conditions, and medication use. Similarly, demography has been reported to contribute to prevalence; these include age, gender, location, level of income, and education level[5,6]. Furthermore, there are scientific reports on the contribution of underlying genetics in the contribution of overweight and obesity prevalence; family obesity is highly related to the obesity of children, which contributes to about 40% and 70%[7]. A study by Al-Hazzaa et al[8]. suggested that the primary target for preventing overweight/obesity among Saudi citizens is promoting active, non-sedentary lifestyles & healthy diets, and it should be a national public health priority.

Obesity and overweight have been reported to be on the rise in Asia. A study in Qatar has reported that females engaged in more sedentary behavior that can lead to overweight/obesity than males; however, they found that males are more likely to be overweight than females[6]. Similarly, another study in Kuwait found that the prevalence of overweight and obesity was 50.5% in boys and 46.5% in girls[9]. However, a nationwide cross-sectional survey found that most healthy obese Saudis were younger, had smaller waist circumference and were more likely to be females[10]. In Saudi Arabia, the prevalence of overweight/obesity is higher than the world average (35% vs. 13%), with a significant contribution to a high rate of death related to obesity[11-13]. For Saudis with a body mass index of 30-50 kg/m2, it was estimated that 15% weight loss would lead to a 53.9% reduction

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in obstructive sleep apnea, a 37.4% reduction in type 2 diabetes (D2M) and an 18.8% reduction in asthma[13]. The high prevalence of overweight/obesity in Saudi Arabia has led to a search for effective weight loss medication among individuals who are overweight/obese.

Management of overweight/obesity involves different approaches, including lifestyle changes and medication use. Recently, there has been an increase in the use of off-label Ozempic (semaglutide) and Mounjaro (tirzepatide), which are drugs that act via the glucagon-like receptor called GLP-1 agonist. Other drugs in this category are also known as incretin mimetics or GLP-1 analogues[14]. They have been approved for the management of D2M and are sometimes prescribed off-label for weight loss in overweight and obese people. Semaglutide and tirzepatide, administered mainly by weekly injections, play a pivotal role in diabetes management[14]. However, there is a report that tirzepatide is more effective than semaglutide for blood sugar control and weight loss but is more expensive and may have additional side effects compared with semaglutide[15]. A recent study in Saudi Arabia has observed poor knowledge of weight loss medications among Saudi citizens[16]. The Saudi Diabetes Scientific Society constituted a team to develop a guideline for the management of diabetes which adopted the Australian guidelines in which semaglutide and tirzepatide are part of the recommendations that have been localized in Saudi Arabia[16]. Despite the surge in the use of Semaglutide or tirzepatide in Saudi Arabia, only 31% of the population is aware of these new medications, with semaglutide being the most popular[17]. Recent studies have explored the effectiveness, usage patterns, and awareness of anti-obesity medications, particularly semaglutide and tirzepatide, in various populations. Rodriguez et al[18]. conducted a real-world comparative study on the effectiveness of tirzepatide versus semaglutide in weight loss among adults in the United States, concluding that tirzepatide led to significantly greater weight reduction at 3, 6, and 12 months compared to semaglutide, with no major differences in gastrointestinal adverse events. Similarly, Alzaidi et al[19]. examined the usage pattern of semaglutide among the Saudi population, revealing that knowledge about the drug was poor among 69.4% of participants, with younger female users more likely to have higher awareness and satisfaction. Almughais et al[20]. assessed public awareness and perception of anti-obesity medications in Saudi Arabia, reporting that 55.6% had good awareness, but concerns over side effects, such as pancreatitis and thyroid tumors, deterred many from using them despite physician recommendations. While these studies provide valuable insights into the effectiveness and perception of these medications, gaps remain in understanding the relationship between knowledge or awareness, interest in losing weight among overweight or obese persons, and their willingness to use semaglutide and Tirzepatide. Another cross-sectional study observed that about 47% and 68% of the participants in their study recognized the use of Ozempic and Mounjaro for use in weight loss program[21]. The authors reported that gender and BMI significantly influenced knowledge of anti-obesity medications[21]. Likewise, Kalaf and Alghamdi[22] noted that median knowledge score of anti-obesity medications in their study involving 361 participants was 44.4%. According to the authors, the use of social media had a positive correlation with knowledge of anti-obesity medications.

Summary of the Literature Review

SN	Authors	Year of publication	Methods/study design	Advantages	Disadvantages/limitations
1	Rodriguez et al.	2023	Retrospective study	Compared on-treatment weight loss in a real-world setting for adults with overweight or obesity initiated on tirzepatide or semaglutide using a large electronic health record database.	Patients' motivations for losing weight were not measured. Patients who did not observe any decrease in weight may likely discontinue or switch the therapy.
2	Alzaidi et al.	2023	Cross-sectional study	Assessed knowledge and awareness of the use of semaglutide and tirzepatide for weight loss program	The actual utilization of semaglutide and tirzepatide was not measured in the study. Additionally, a cause-effect relationship between the variables could not be established due to the cross-sectional design of the study.
3	Almughais et al.	2023	Analytical, cross-sectional study	The authors evaluated awareness of semaglutide and other anti-obesity drugs for use in weight loss and its relationship with demographic characteristics.	Participant's concerns about the use of semaglutide were not examined.
4	Algarni et al.	2023	Cross-sectional study	Examined the level of knowledge and attitudes toward the use of weight management medications as well as factors associated with it	Some important determinants of knowledge and attitudes such as health literacy and access to healthcare were overlooked. There is the possibility of social desirability bias.
5	Abutaima et al.	2024	Cross-sectional study	The study assessed the knowledge, attitudes, and practices regarding the use of GLP-1 receptor agonists in weight management.	Possibility of social desirability bias due to the self-reported nature of the study. Since the study was an online survey, poor internet access might have affected the participation of persons in rural areas in the study.
6	Khalaf & Alghamdi	2024	Cross-sectional study	Explored knowledge and perception of anti-obesity medications among individuals visiting primary healthcare centers. The sample size was large.	Self-reported nature of the study might have introduced response bias.

OBJECTIVES

The primary objectives of the study were to conduct a cross-sectional survey to assess the prevalence of overweight and obesity, perception and level of usage of the new weight medications (Semaglutide or tirzepatide) in the Saudi Arabian population. The secondary objective was to determine the predictors of perceptions and level of usage of Semaglutide or Tirzepatide among the study group. This study contributes to the growing body of evidence on weight management by exploring the usage and perception of novel parenteral medications, such as semaglutide and tirzepatide, in Saudi Arabia. Given the increasing burden of obesity and its associated health risks, understanding the acceptance, accessibility, and real-world effectiveness of these medications is crucial for shaping clinical guidelines and public health strategies. The findings may provide insights into patients' motivations, adherence patterns, and potential barriers to uptake, thereby informing healthcare professionals and policymakers on optimizing obesity management through pharmacological interventions. Additionally, this research could highlight the role of pharmacists and healthcare providers in counseling patients on these medications, ultimately improving weight-loss outcomes and reducing obesity-related complications.

METHODS

Ethical statement/consent: Ethical approval was obtained from the institutional review board (IRB) at King Abdulaziz University, Faculty of Pharmacy, with Reference Number PH-1445-10. A statement of implied consent and an invitation to participate was developed using Google Forms, and participants gave their consent before proceeding with the survey.

Study design/population: We designed a cross-sectional survey based on the *Checklist for Reporting Results of Internet E-Surveys* (CHERRIES) statement[23]. We also followed *the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.*[24] The study was conducted among Saudi Arabian citizens and non-citizens. Eligible participants were adult males and females 18 years old and above. People below 18 years of age were excluded from the study.

Study settings: The study was conducted in Saudi Arabia, a country that lies between 23.8859° N and 45.0792° E in West Asia. It covers the bulk of the Arabian Peninsula and has a land area of about 2,150,000 km2 (830,000 sq mi), making it the fifth-largest country in Asia and the largest in the Middle East with an estimated population of 34.1 million[25]. Saudi Arabia has a relatively young population, with a significant proportion under the age of 30. A sedentary lifestyle and physical inactivity among women and older adults appear common. Furthermore, cultural factors, such as limited opportunities for women to engage in sports, and environmental factors, like extreme heat, contribute to this trend. Rapid urbanization has led to lifestyle changes, with more people living in cities and adopting sedentary behaviors. The reliance on cars for transportation and the availability of fast food have further exacerbated the issue.

Study procedure/recruitment: A five-panel of experts developed the study questionnaire after an extensive literature search. The questionnaire was subjected to face and content validity. Adjustments were made to the questionnaire items as needed. The final version of the questionnaire was subsequently incorporated into Google Forms. The survey link to the Google form contains a hyperlink to the page and study information. The link was then shared via social media platforms, groups, and personal accounts such as Twitter, Facebook, and WhatsApp of participants.

Sampling and sample size determination: The sample size (n) for the study was calculated using two mean sample estimations with the aid of OpenEpi version three (3) software (www.openepi.com). Assuming a finite population, a standard deviation of 10 and the mean difference between groups was set at two (2), with a power of 80% and a confidence interval of 95%. An attrition rate of 10% was assumed. We calculated a minimum sample of 550. A purposive sampling technique was employed in the recruitment of participants.

Data preparation and analysis: The data collected was downloaded Google Survey form and exported into Microsoft Excel. Thereafter, the data were coded, cleaned, and transferred to IBM's Statistical Package for the Social Sciences (SPSS) version 28.0 for actual statistical analysis.[26] The data were then analyzed using descriptive and inferential statistics. Categorical variables were reported as frequencies and percentages. The association between categorical variables was determined using the Pearson chi-square test. Chi-square was initially conducted to screen each variable for multivariable analysis, and variables that were considered relevant based on biological parsimony were included in the multiple logistic regression (MLR) to determine the factors associated with overweight/obesity and knowledge of the new weight loss medication. The MLR was performed using the backward likelihood ratio option to select the adjusted odds ratio (OR) of the potential independent predictors. Multicollinearity and interactions between the variables were checked. Assumptions were checked using Hosmer-Lemeshow and Omnibus Tests of Model Coefficients. The final model was presented as adjusted OR with 95% CIs and corresponding p-values. P <0.05 was considered statistically significant.

RESULTS

A total of 549 responses were received. Thirty-one (31) responses were excluded, and 518 responses were used for analysis (Figure 1).

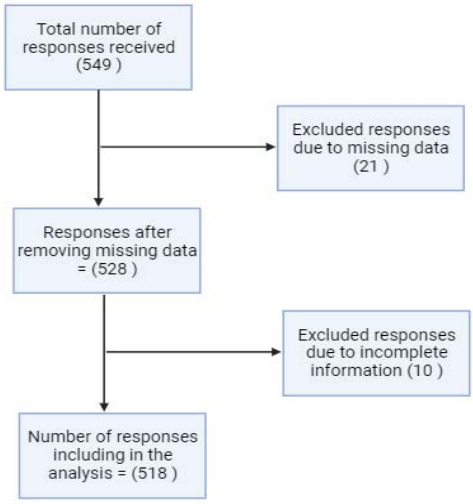

Figure 1. A schematic illustration of data collection and cleaning

Missing data: When there is no response on essential items related to the research construct.

Incomplete information: When there is an incomplete response on essential demographic items.

Respondents' demographics

There are more female respondents than males, 385 (74.3%) and 133 (25.7%), respectively. The age group that interacted most with the survey was between 30 - 49, with 344 (66.4%). (Table 1). Most participants have a bachelor's degree, 251 (48.5%), followed by a postgraduate degree, 207 (40%). The average monthly income group with the highest response is those earning between 10K SAR and less than 20K SAR 173 (33.4%) (Table 1). The mean weight of participants was 74.7±19 in kilogram, and the mean height was 163.1±61 centimeters. The average Body Mass Index of the participants was 28.1.

Table 1. Demographics of the study respondents

	Category	Number of responses (%)
Gender	Female	385 (74.3%)
	Male	133 (25.7%)
Age	18-29	77 (14.9%)
	30-49	344 (66.4%)
	50-64	87 (16.8%)
	65 or more	10 (1.9%)
Nationality	Saudi	503 (97.1%)
	Non-Saudi	15 (2.9%)
Education level	Bachelor	251 (48.5%)
	Diploma	19 (3.7%)
	Elementary school or less	4 (0.8%)
	High school	32 (6.2%)
	IDK	2 (0.4%)
	Intermediate school	3 (0.6%)
	Postgraduate study	207 (40%)
Average monthly income in Saudi Arabian Riyals (SAR)	10K to less than 20k	173 (33.4%)
	20k to less than 30k	87 (16.8%)
	30K or more	51 (9.8%)
	5k to less than 10k	78 (15.1%)
	IDK	14 (2.7%)
	Less than 5k	52 (10%)
	No stable/fixed income	63 (12.2%)

IDK: I do not know

Overweight/Obese and Interest in Losing Weight

Based on the calculated Body Mass Index (BMI) of the respondents 342 (66%) are either overweight or obese, However only 162 (31%) are overweight while 180 (35%) are obese (Figure 2A). Furthermore, all the overweight participants are interested in losing weight except 6% (9) of overweight participants. Interestingly, only two obese participants indicated no interest in losing weight. In contrast, based on the history of being diagnosed as obese, most participants have not been previously diagnosed with obesity: 347 (66.9%), while 138 (26.6%) have been previously diagnosed. Most respondents indicated interest in losing weight 429 (82.8%). A few participants showed no interest in losing weight 89 (17.1%). Other respondents did not indicate any interest. Interestingly, all the participants who have been previously diagnosed with obesity have indicated interest in losing weight. (Figure 2B).

Participant's Knowledge of Semaglutide or Tirzepatide

A total of 112 participants responded to the items of the tools related to knowledge of semaglutide or tirzepatide. Most participants indicated that they obtained the new medications through a prescription from healthcare providers 70 (62.5%), while others obtained the medications without the intervention of a healthcare provider 42 (37.5%). Most participants are aware of the need to taper the dose 100 (89.3%), side effects 92 (82.1%), and the need for counselling in using these medications 77 (68.8%). A few participants don't know any side effects of the medications (Figure 3).

Prefered mode of administration and formulation of weight loss medications

Most participants indicated no interest at all in using either the injection 259 (50%) or pills/capsules 239 (49.1%) as a preferred form of administration and formulation. However, some participants indicated somewhat interest in injections 123 (23.7%) and pills/capsules 103 (19.9%), while others were very interested in injections 65 (12.5%) and pills/capsules 103 (19.9%). A few respondents were either neutral or indicated no response (Figure 4).

Interest in Using New Weight Loss Medications

Most participants were not at all interested in using Semaglutide or Tirzepatide if it is not obtained through recommendation/prescription by healthcare providers 292 (56.4%) or if there is rebound weight gain after stoppage 316 (61%). However, some participants indicated somewhat interest 87 (16.8%) or very interested 161 (31.1%) if the medications are cost-effective. Similarly, some participants indicated some interest 121 (23.4%) or very interested 202 (40%) if the medications are safe and effective. A few participants were either neutral or did not indicate any special interest in the type of usage for the medications (Figure 5).

Factors Affecting the Perception and Knowledge of Participants

The Chi-square test did not reveal enough evidence to show any association between a history of obesity or use of semaglutide/ tirzepatide and age, gender, educational level, and average monthly income (p>0.05). However, we found evidence of an association between interest in losing weight and age among overweight/obese participants [X^2 (3, N = 518) = 43.7, p < 0.001] and all participants [X^2 (3, N = 518) = 25.3, p < 0.001]. Similarly, we found an association between gender and interest in losing weight [X^2 (1, N = 518) = 10.5, p < 0.001]. We also found an association between obesity and interest in losing weight among those with high BMI and those with a history of diagnosis [X^2 (2, N = 518) = 134.0, p < 0.001] and [X^2 (2, N = 518) = 34.0, p < 0.001], respectively. Additionally, we found an association between obesity and the use of weight loss medications among those with high BMI and those with a history of diagnosis [X^2 (2, N = 518) = 34.0, p < 0.001] and [X2 (2, N = 518) = 57.0, p < 0.001], respectively (Table 2).

Predictors of overweight/ obesity Among Participants

The results presented in Table 3 highlighted some important predictors of overweight/obesity among participants such as; age influence and gender impact. Participants from the age group of 18-19 showed 15% lower odds of being overweight/obese, (adjusted odds ratio [aOR] 0.060; 95% confidence interval [CI], 0.009-3.9; p=0.003) as compared with those in the age group 65 or more, while the age group 30-49 did

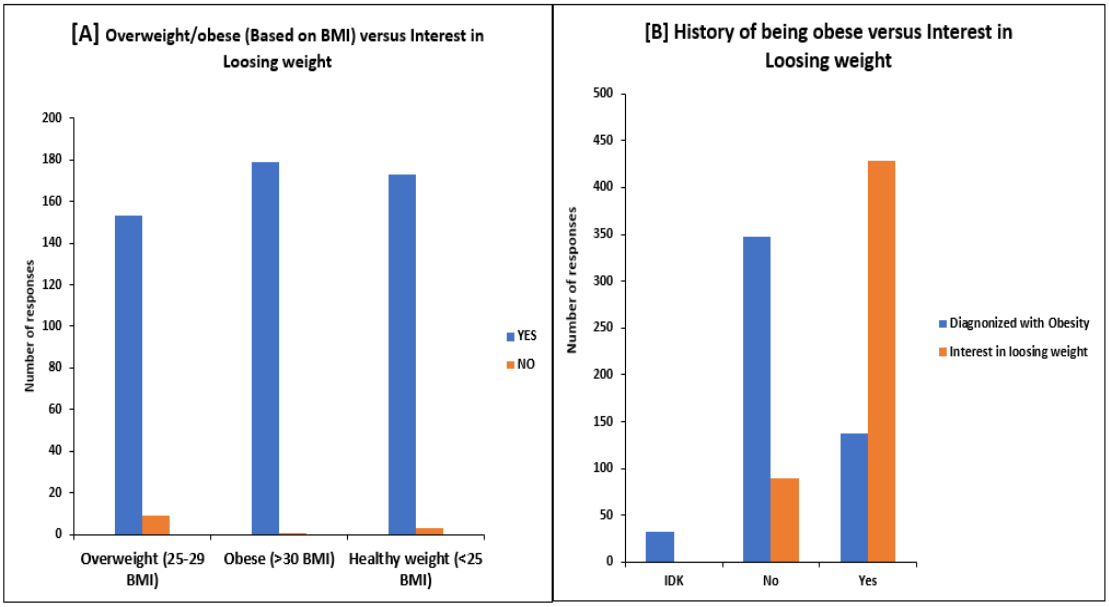

Figure 2. [A] Overweight/obese participants and Interest in Losing weight
[B] Participant's History of Obesity and Interest in Losing Weight

Key: IDK = I do not know, BMI = Body Mass Index

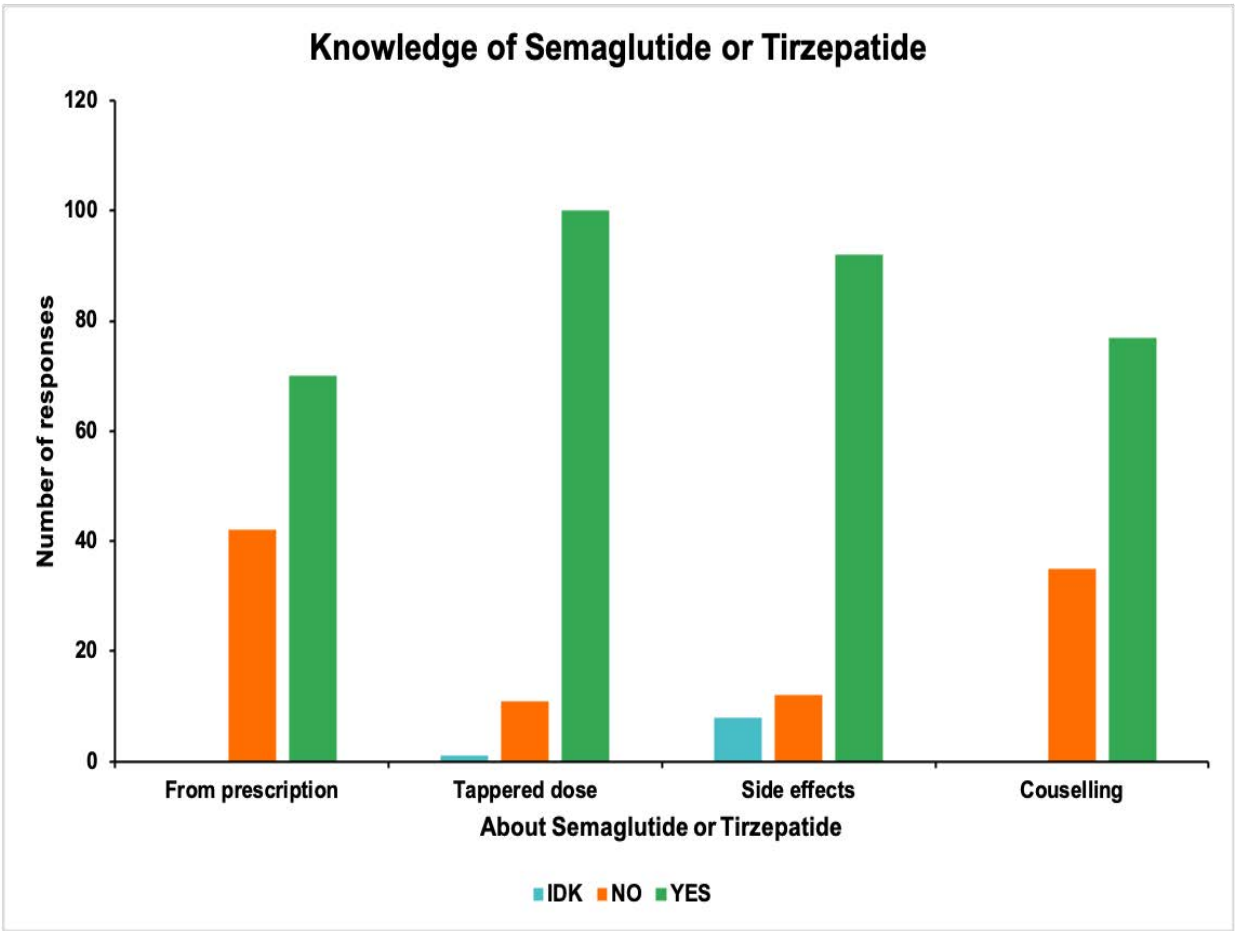

Figure 3. Participant's Knowledge of Semaglutide or Tirzepatide

Key: IDK = I do not know

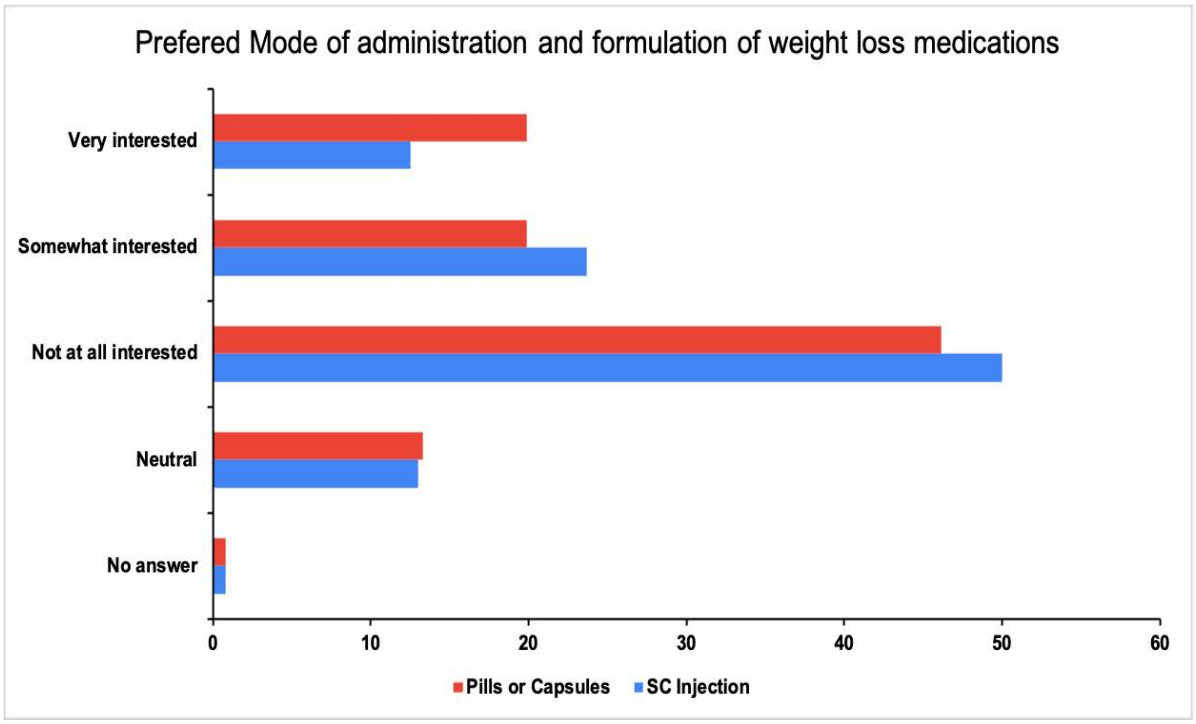

Figure 4. Prefered mode of administration and formulation of Semaglutide or Tirzepatide
Key: SC = Subcutaneoous

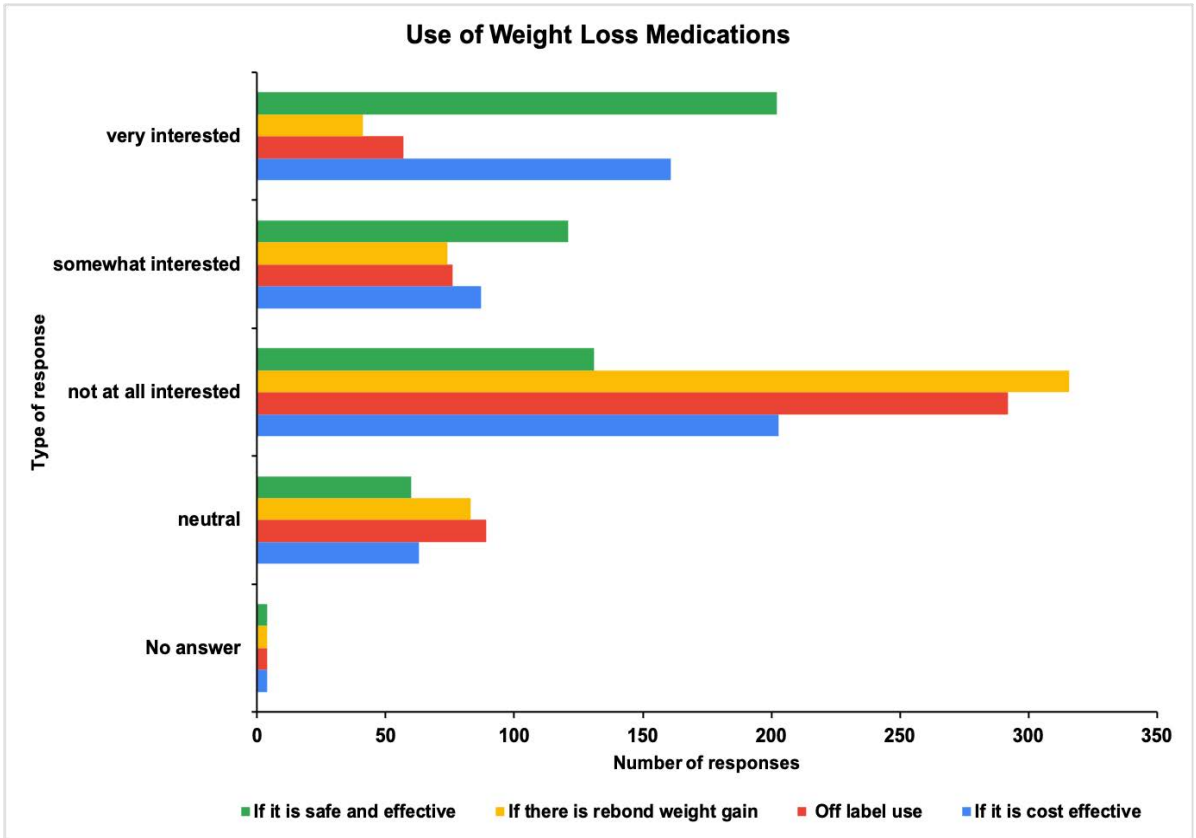

Figure 5. Participants' Responses on Interest in Using Semaglutide or Tirzepatide

Table 2. Association Between Perception and Knowledge with Variables

Variable	Chi-square (x^2)	Degree of freedom (df)	*p*-value
Relationship between variables and overweight/obesity (Based on BMI) among respondents			
Age	43.7[a]	6	0.001*
Gender	3.08[a]	2	0.215
Educational Level	19.56[a]	12	0.076
Average monthly income (SAR)	13.236[a]	12	0.352
Relationship between variables and interest in losing weight among respondents			
Age	25.276[a]	3	0.001*
Gender	10.493[a]	1	0.001*
Educational Level	10.722[a]	6	0.097
Average monthly income (SAR)	8.277[a]	6	0.218
Obesity (BMI)	134[a]	2	<0.001*
Obesity (Diagnosed)	34[a]	2	<0.001*
Relationship between variables and use of semaglutide or tirzepatide			
Age	7.993[a]	9	0.535
Gender	4.549[a]	3	0.208
Educational Level	19.268[a]	18	0.376
Average monthly income (SAR)	21.986[a]	18	0.233
Obesity (BMI)	34[a]	2	<0.001*
Obesity (Diagnosed)	57[a]	2	<0.001*

*The Chi-square test was significant at $p < 0.05$
[a]Test exceeded 5 counts, which is the minimum required number for a valid Chi-square test

Table 3. Multiple Logistic Regression on Overweight/obese participants (Based on BMI)

Variables	Sample size	*Adjusted OR (95% CI)	*p*-value
Age			
18-29	77	0.06 (0.6-3.90)	0.003
30-49	344	1.06 (4.8-23.30)	0.992
50-64	87	0.78 (3.2-19.10)	0.969
65 or more	10	1	
		Gender	
Female	385	0.28 (0.15-0.53)	0.001
Male	133	1	
Average monthly income in SAR			
10K to less than 20k	173	1.03 (0.45-2.38)	0.936
20k to less than 30k	87	1.23 (0.45-3.29)	0.680
30K or more	51	0.55 (0.19-1.56)	0.262
5k to less than 10k	78	0.73 (0.30-1.77)	0.490
less than 5k	52	1.28 (0.45-3.57)	0.638
no stable/fixed income	63	1	
Nationality			
Non-Saudi	15	0.60 (0.15-2.30)	0.463
Saudi	503	1	
Highest level of education			
Bachelor	251	0.92 (0.52-1.61)	0.774
Diploma	19	0.56 (0.16-1.98)	0.372
Elementary school or less	4	0.07 (0.02-9.18)	0.280
High school	32	0.79 (0.25-2.52)	0.686
Intermediate school	5	0.17 (0.01-3.61)	0.254
Post-graduate study	207	1	

Table 4. Multiple Logistic Regression on Knowledge of Ozempic or Mounjaro

Variables	Sample size	*Adjusted OR (95% CI)	*p*-value
Age			
18-29	77	0.44 (0.00-5.67)	0.208
30-49	344	0.14 (0.02-8.52)	0.350
50-64	87	0.05 (0.01-3.72)	0.199
65 or more	10	1	
Gender			
Female	385	0.78 (0.10-5.78)	0.81
Male	133	1	
Average monthly income in SAR			
10K to less than 20k	173	0.67 (0.07-6.46)	0.726
20k to less than 30k	87	0.27 (0.01-9.51)	0.469
30K or more	51	0.55 (0.01-33.9)	0.774
5k to less than 10k	78	0.49 (0.03-8.67)	0.623
less than 5k	52	2.17 (0.19-24.50)	0.531
no stable/fixed income	63	1	
Nationality			
Non-Saudi	15	0.89 (0.618-1294)	<0.001
Saudi	503	1	
Highest level of education			
Bachelor	251	0.70 (0.13-3.79)	0.680
Diploma	19	0.59 (0.02-147.10)	0.851
Elementary school or less	4	0.65 (7.39-5643)	0.925
High school	32	1.43 (0.07-29.70)	0.818
Intermediate school	5	0.29 (7.41-1165)	0.852
Post-graduate study	207	1	

not show any significant differences. Five variables were included in the multiple logistics regression (MLR) from the result of Chi-square based on their importance in managing overweight/obesity. The final model of the MLR demonstrates that females have 74% lower odds of being previously diagnosed with overweight/obesity (adjusted odds ratio [aOR] 0.28; 95% confidence interval [CI], 0.15-0.53; p=0.001

Predictors of Knowledge of semaglutide and tirzepatide

The result from Table 4 highlighted insight into factors that predict participants' knowledge of semaglutide or tirzepatide. Five variables were included in the multiple logistics regression (MLR) from the result of the Chi-square based on their importance in the knowledge of semaglutide and tirzepatide. The final model of the MLR demonstrates that non-Saudis have 3% lower odds of knowing or being aware of semaglutide or tirzepatide (aOR 0.89; 95% [CI], 0.618-1294; p=0.005). However, the model did not demonstrate a significant relationship with other variables including age, gender, income, education level and knowledge of these medications (Table 4).

DISCUSSION

Our cross-sectional study focused on the awareness, perceptions, and use of the new parenteral weight loss medication in Saudi Arabia. It was conducted among adults, males, and females aged 18 years and above. Participants of different educational levels and monthly incomes participated in the survey. We found an alarming high prevalence of overweight/obesity based on participants' BMI, 66% of participants were either overweight or obese (31% overweight and 35% obese) (Figure 2A). Although we found a high prevalence, it has been previously projected to be increased from around 12% in 1992 to 41% by 2022 in men, and from 21% to 78% in women[27]. While most participants have not been previously diagnosed as overweight or obese, we still found an alarming percentage (26.7%) of respondents who were previously clinically overweight or obese (Figure 2B). However, this percentage is similar to what the World Health Organization (WHO) reported for Saudi Arabia in 2016 (Overweight = 67%, obesity 33%)[28]. The overall pooled prevalence in the Middle East was estimated for obesity at 21.17 (95% CI: 17.05–26.29) and overweight at 33.14 (95% CI: 26.87–40.87), other studies have also found a high rate prevalence of obesity and overweight in the middle east[29,30]. Additionally, a recent study conducted among a large sample size in Saudi Arabia reported a prevalence of 24.7%[31]. Another recent study reported a prevalence of being overweight and obese at 32.8% and 23%, respectively[32]. This is an indication that there is a need for health policies and awareness to address the rise in the prevalence of overweight/obesity in Saudi Arabia.

Management of overweight/obesity involves pharmaceutical and non-pharmaceutical measures, which involve the use of drugs or changes in lifestyles. Recently, there has been a surge of newly off-label medications, semaglutide and tirzepatide, in Saudi Arabia. They belong to the class of drugs that act via the glucagon-like receptor called GLP-1 agonist. In our study, most respondents to the items related to knowledge of these medications have obtained them through prescriptions, and they are aware of the side effects, how to use it, and the need for expert counselling before usage (Figure 3). However, a recent study reported that only 31% of the population knows about these two new medications, with semaglutide being the most popular[16]. These new medications mostly come in parenteral formulations; however, most respondents indicated no interest at all in using the medication in either pills/capsules or parenteral formulations (Figure 4). Furthermore, most respondents preferred to get semaglutide and tirzepatide through prescriptions from experts, and participants' interest increased if the medications were safe and cost-effective (Figure 5).

Our study evaluates respondents' demographic factors that may be

associated with a history of being diagnosed with obesity, interest in losing weight, and familiarity with the new medications semaglutide and tirzepatide. We found a relationship between age & gender with participants' interest in losing weight, indicating that Saudi Arabians' age or gender might influence their decision to lose weight, ultimately influencing whether they will use any of the new medications (semaglutide and tirzepatide). We also found a relationship between obesity and interest in losing weight as well as obesity and the use of weight loss medications, indicating a strong desire for overweight and obese citizens to use the new weight loss medications. We further use logistic regression to demonstrate the predictors of a history of being overweight/obese and found that gender is a predictor and that females have 74% lower odds of being previously diagnosed with overweight/obesity (Table 3). Another study has also demonstrated that the odds of being obese increased with age (OR: 1.07; $p < 0.001$) and in males (OR: 2.16; $p < 0.001$). However, they found that there are more overweight/obese women than men and that average income has a relationship with overweight/obesity[28]. Their findings as well as ours have been earlier projected by a systematic review conducted in 2014[24]. Additionally, our study demonstrated that nationality predicts awareness of the new weight loss medications, and non-Saudis have a 3% lower odds of knowing or being aware of semaglutide and tirzepatide (Table 4). Although we had a few responses from non-Saudis, it is an indication that being overweight/obese is an issue of concern in Saudi Arabia, especially among Saudis, as previously reported a higher prevalence among Saudis compared with non-Saudis.

Furthermore, the survey also highlighted the perceptions of respondents in Saudi Arabia in various aspects related to weight loss medication and intervention. The majority (56.4%) were not interested in using semaglutide or tirzepatide without expert recommendation. This showed that participants seem to trust and prefer healthcare professional guidance in choosing to use these medications for weight loss. This aligns with a study on the self-perception of individuals seeking matters on weight management[33]. However, there is a concern about possible rebound weight gain in 61% of participants who showed disinterest in the use of these medications, which emphasizes the need for medications with long-lasting effects. This was supported by a study conducted by Fabricatore et al, (2009) which emphasized the importance of sustained weight loss to prevent relapse[34]. Participants (16.8%) are also interested in whether the medications are cost-effective, highlighting the significant role of affordability in decision-making. This could guide and encourage more individuals to use these medications in weight loss interventions[35]. Additionally, 40% of participants perceived the need for the safety and effectiveness of these medications, this was equally highlighted in the existing literature on patients' preferences for safer weight loss medications[36]. Moreover, healthcare providers can play a crucial role in addressing these concerns by providing accurate information and guidance to patients.

Limitation

These include the inherent shortcomings of online survey methods, which limit the inclusion of participants to only those with internet access to our study, and the skewness of responses between Saudis and non-Saudis. Overrepresentation of the 30-49 age group limits the insight into younger and older populations on their perspective on weight loss. Furthermore, the majority of the participants included are Saudi nationals, limiting the generalizability to non-Saudi nationals. There was also skewness towards income distribution as the majority of participants are 10k-20k SAR, with lower participants from low-income groups which could also provide information on the affordability of these drugs. Despite providing important insights, and using purposive sampling in our study, there could also be a limitation in generalising our findings to the general population.

Public health and regulatory concerns

Our study, along with previous studies[22,23], has revealed that there is a rise in the prevalence of overweight/obesity among the Saudi Arabian population and that there is an increase in awareness of new parenteral medications (semaglutide and tirzepatide) for weight loss. Although part of the population prefers to obtain this medication through recommendations from experts, these medications are used off-label for weight loss. Despite being injectables, they are frequently accessed without a prescription or expert consultation. However, Zepbound™, containing tirzepatide, was recently approved for adults, and Wegovy™, containing semaglutide, was approved for both adults and children aged 12 and older with obesity or some adults with excess weight (overweight), who also have weight-related medical problems, to lose weight and keep it off, in addition to diet and exercise. This finding has further buttressed the need for mass awareness campaigns on the importance of lifestyle changes that can lead to a decrease in the prevalence of overweight/obesity in Saudi Arabia. Additionally, there is a need for regulatory bodies in Saudi Arabia to provide policies and appropriate classification of this new weight loss medication to avoid over-the-counter usage and self-medication among health-seeking people who are overweight or obese.

CONCLUSION

This study revealed that awareness, perception, and utilization of new weight loss medications in Saudi Arabia are gaining popularity, especially semaglutide and tirzepatide which suggests a growing interest in and acceptance of pharmaceutical interventions for weight management. This implies a shift from a more comprehensive approach to obesity management to pharmaceutical intervention as well as lifestyle modifications. However, despite this, there appears to be a potential gap in respondents' awareness of how to ascertain their weight status through diagnosis.

The survey suggested growing awareness and interest in weight management among the Saudi population. Our study provided policy guidance for future healthcare initiatives that prioritize patients seeking weight loss interventions for effective treatment options. It also demonstrated the need for more accessible and cost-effective weight management medications to meet the demands of the survey participants. Additionally, the survey also highlighted the need to increase public health awareness about obesity and its associated risks and encourage individuals to check their weight status, have weight management discussions with healthcare providers, and adopt healthier lifestyles.

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REFERENCES

1. MOH. The Saudi Arabia Ministry of Obesity Health Awareness. 2023 [cited 2023 Dec 19]. Available from: https://www.moh.gov.sa/en/awarenessplateform/ChronicDisease/Documents/Obesity
2. WHO. Fact sheet on overweight and obesity. 2023 [cited 2023 Dec 19]. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
3. Upadhyay J, Farr O, Perakakis N, et al. Obesity as a disease. Med Clin North Am. 2018;102(1):13-33.
4. Abbott L, Lemacks J, Greer T, et al. Development and evaluation of a measure for social support provided by friends during lifestyle management programs. Healthcare (Basel). 2022;10(5).
5. Salam MM, Rabeya, Salam MW, et al. Obesity and overweight: A global public health issue. Adv Hum Biol. 2023;13(1):154-6.
6. Kerkadi A, Al Thani A, Al-Chetachi W, et al. The relationship between lifestyle factors and obesity indices among adolescents in Qatar. Int J Environ Res Public Health. 2019;16(22).
7. Loos RJF, Yeo GSH, et al. The genetics of obesity: from discovery to biology. Nat Rev Genet. 2022;23(2):120-33.
8. Al-Hazzaa HM, Abahussain NA, Al-Sobayel HI, et al. Lifestyle factors associated with overweight and obesity among Saudi adolescents. BMC Public Health. 2012;12:354.
9. Al-Haifi AR, Al-Fayez MA, Al-Athari BI, et al. Relative contribution of physical activity, sedentary behaviors, and dietary habits to obesity among Kuwaiti adolescents. Food Nutr Bull. 2013;34(1):6-13.
10. Nasreddine L, Naja F, Chamieh MC, et al. Prevalence and predictors of metabolically healthy obesity in adolescents: findings from the national "Jeeluna" study in Saudi Arabia. BMC Pediatr. 2018;18(1):281.
11. Salem V, AlHusseini N, Abdul Razack HI, et al. Prevalence, risk factors, and interventions for obesity in Saudi Arabia: A systematic review. Obes Rev. 2022;23(7):e13448.
12. DeNicola E, Aburizaiza OS, Siddique A, et al. Obesity and public health in the Kingdom of Saudi Arabia. Rev Environ Health. 2015;30(3):191-205.
13. Alqahtani SA, Alsharqi A, Alanzi T, et al. Obesity burden and impact of weight loss in Saudi Arabia: A modelling study. Adv Ther. 2023;40(3):1114-28.
14. Han SH, Safeek R, Ockerman K, et al. Public interest in the off-label use of GLP-1 agonists (Ozempic) for cosmetic weight loss: A Google Trends analysis. Aesthetic Surg J. 2024;44(1):60-7.
15. Baggio LL, Drucker DJ, et al. Glucagon-like peptide-1 receptor co-agonists for treating metabolic disease. Mol Metab. 2021;46.
16. Alshaikh A, Alfadda A, Alrobayan A, et al. Clinical practice guideline for the management of overweight and obesity in adults in Saudi Arabia. Int J Clin Med. 2022;13(12):590-649.
17. Algarni MA, Alotaibi MF, Alanazi FN, et al. Knowledge and attitude of the general population in Saudi Arabia toward weight management medications (WMMs): A cross-sectional study. Cureus. 2023;15(8):e42875.
18. Rodriguez PJ, Cartwright BMG, Gratzl S, et al. Comparative effectiveness of semaglutide and tirzepatide for weight loss in adults with overweight and obesity in the US: A real-world evidence study. medRxiv. 2023. Available from: https://doi.org/10.1101/2023.11.21.23298775
19. Alzaidi AM, Kofi M, Al Mutairi MH, et al. Pattern of using semaglutide injection among the population in Saudi Arabia. Merit Res J Med Med Sci. 2023;11(10):236-41.
20. Almughais ES, Alshehri MH, Alsatti M, et al. Awareness and perception of anti-obesity medications among Al-Ahsaa, Riyadh, and Hail in Saudi Arabia populations. Cureus. 2023;15(6):e40425.
21. Abutaima R, Barakat M, Sawan HM, et al. Knowledge, attitudes, and practices towards the use of GLP-1 receptor agonists for weight loss among the general population in Jordan: a cross-sectional study. PLoS One. 2024;19(12):e0314407.
22. Khalaf RM, Alghamdi HA. Knowledge and perception of anti-obesity medications among primary healthcare center visitors in Jeddah, Saudi Arabia in 2024: an analytical cross-sectional study. Cureus. 2024;16(8):e68240.
23. Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). J Med Internet Res. 2004;6(3):e34.
24. von Elm E, Altman DG, Egger M, et al. The STROBE statement: guidelines for reporting observational studies. Lancet. 2007;370(9596):1453-7.
25. Saudi General Authority for Statistics. Estimated population of Saudi Arabia 2019 [Internet]. 2019 [cited 2023 Dec 25]. Available from: https://www.stats.gov.sa
26. IBM Corp. IBM SPSS Statistics for Mac, version 2023. Armonk (NY): IBM Corp; 2023.
27. Al-Quwaidhi AJ, Pearce MS, Critchley JA, et al. Trends and future projections of the prevalence of adult obesity in Saudi Arabia, 1992–2022. East Mediterr Health J. 2014;20(10):589-95.
28. World Health Organization. WHO diabetes country profiles: Saudi Arabia [Internet]. 2023 [cited 2023 Dec 25]. Available from: https://www.who.int/diabetes/country-profiles/sau_en.pdf
29. Okati-Aliabad H, Jalali R, Shorafa E, et al. Prevalence of obesity and overweight among adults in the Middle East countries from 2000 to 2020: a systematic review and meta-analysis. J Obes. 2022;2022:8074837.
30. Kilpi F, Webber L, Musaigner A, et al. Alarming predictions for obesity and non-communicable diseases in the Middle East. Public Health Nutr. 2014;17(5):1078-86.
31. Althumiri NA, Alqahtani A, Alghnam S, et al. Obesity in Saudi Arabia in 2020: prevalence, distribution, and its current association with various health conditions. Healthcare (Basel). 2021;9(3):311.
32. Alsulami S, Alghamdi RA, Alqurashi KA, et al. Obesity prevalence, physical activity, and dietary practices among adults in Saudi Arabia. Front Public Health. 2023;11:1124051.
33. Croghan IT, Huber JM, Hurt RT, et al. Patient perception matters in weight management. Prim Health Care Res Dev. 2018;19(2):197-204.
34. Fabricatore AN, Wadden TA, Moore RH, et al. Predictors of attrition and weight loss success: results from a randomized controlled trial. Behav Res Ther. 2009;47(8):685-91.
35. Gudzune KA, Doshi RS, Mehta AK, et al. Efficacy of commercial weight-loss programs: an updated systematic review. Ann Intern Med. 2015;162(8):501-12.
36. Ryan DH, Yockey SR. Weight loss and improvement in comorbidity: differences at 5%, 10%, 15%, and over. Curr Obes Rep. 2017;6(3):187-94.