Comparative study between commonly used medications for weight loss

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Abstract

Background:
Obesity is a growing global health concern associated with multiple chronic conditions, including diabetes mellitus, hypertension, and cardiovascular diseases. Despite lifestyle interventions being the first-line treatment, many individuals struggle to achieve significant weight loss, leading to the increased use of pharmacological treatments. This study aims to compare the effectiveness, adherence, and discontinuation rates of commonly used weight-loss medications, including semaglutide, metformin, orlistat, phentermine, naltrexone, liraglutide, and tirzepatide.

Methods:
A cross-sectional study was conducted among 500 participants with obesity from four Iraqi provinces: Karbala, Najaf, Diwaniya, and Hilla. Data on demographic characteristics, medication use, side effects, and adherence were collected through structured questionnaires. Statistical analysis was performed using SPSS (version 20), and descriptive statistics were used to assess medication utilization patterns.

Results:
Among the participants, 28.8% reported using weight-loss medications. Orlistat (25.6%) and metformin (22.4%) were the most frequently used, followed by semaglutide (12.8%) and liraglutide (12.0%). A significant proportion (34.4%) discontinued medication due to side effects, including nausea (15.8%), vomiting (6.6%), dizziness (8.4%), and weight regain upon cessation (6.0%). Financial constraints (27.2%) also contributed to medication discontinuation.

Conclusion:
This study highlights the diverse usage patterns of weight-loss medications in Iraq and identifies key barriers to adherence, including side effects and financial constraints. The findings align with international research but also underscore the need for affordable and sustainable obesity management strategies. Future studies should explore long-term effectiveness and patient-centered approaches to improve adherence.

Keywords: Obesity, Weight-loss medications, Semaglutide, Orlistat, Adherence, Pharmacological treatment

Introduction

Obesity is a significant global health concern, contributing to various chronic diseases such as diabetes mellitus (DM), hypertension, cardiovascular diseases, and metabolic disorders. The increasing prevalence of obesity has led to extensive research on various weight management strategies, including dietary modifications, physical activity, behavioral therapy, surgical interventions, and pharmacological treatments (Bray et al., 2016). Among these, weight-loss medications have emerged as an essential adjunct for individuals struggling with obesity, particularly those who do not achieve sufficient weight reduction through lifestyle modifications alone (Apovian et al., 2015).

Pharmacological interventions for weight loss include a range of medications that target different physiological pathways to reduce appetite, enhance satiety, or inhibit fat absorption. Some of the most commonly used medications include semaglutide, metformin, orlistat, phentermine, naltrexone, liraglutide, and tirzepatide (Khera et al., 2022). Each of these drugs has a distinct mechanism of action, efficacy, and safety profile, making it essential to evaluate their comparative effectiveness in real-world populations.

Semaglutide and liraglutide, both glucagon-like peptide-1 (GLP-1) receptor agonists, have gained significant attention due to their ability to promote weight loss by reducing appetite and increasing satiety (Wilding et al., 2021). Metformin, traditionally used for type 2 diabetes, has also been observed to facilitate weight reduction, particularly in individuals with insulin resistance (Knowler et al., 2002). Orlistat, a lipase inhibitor, prevents fat absorption in the gastrointestinal tract, making it an effective option for long-term weight management (Davidson et al., 1999). Meanwhile, phentermine, a sympathomimetic amine, and naltrexone-bupropion combination therapy target appetite suppression through central mechanisms (Greenway et al., 2010). Tirzepatide, a relatively new dual GLP-1 and glucose-dependent insulinotropic peptide (GIP) receptor agonist, has also demonstrated promising weight-loss effects in recent clinical trials (Jastreboff et al., 2022).

Despite the availability of multiple pharmacological options, the choice of an appropriate medication depends on various factors, including patient-specific characteristics, underlying medical conditions, tolerability, and cost considerations. Additionally, adherence to treatment is influenced by side effects such as nausea, vomiting, dizziness, and weight regain after discontinuation (Yanovski & Yanovski, 2014). Therefore, a comparative analysis of these medications, including their real-world efficacy, side effects, and discontinuation rates, is crucial to optimizing obesity management strategies.

This study aims to evaluate and compare the commonly used weight-loss medications among individuals with obesity in four provinces: Karbala, Najaf, Diwaniya, and Hilla. By analyzing patient preferences, medication adherence, and reasons for discontinuation, this research will provide valuable insights into the practical effectiveness of different pharmacological options for weight loss.

Methods:

This cross-sectional study was conducted among 500 participants with a current or a history of obesity across four provinces: Karbala, Najaf, Diwaniya, and Hila. The study occurred from October 1, 2024, to the end of December 2024. Participants were asked if they would participate, and all participants signed a consent form to confirm their willingness. Each Participant filled out the required information. Demographic information was collected, and questions were carefully adapted from the literature review and aligned with the study's objectives; some suggestions came from experts who reviewed the questions for validation. The data analysis was conducted using the SPSS software package (version 20; SPSS Inc., Chicago, IL). The Age variable was analyzed as mean ±SD.

The sample size needed for the study was calculated using the equation below [1-3]:

$$\boldsymbol{n = \frac{z^2\, p\, (1 - p)}{d^2}}$$

Where n = the sample size; Z = the statistic for the 95% level of confidence used in the power analyses, which was 1.96; p = the expected prevalence or the proportion used, which was (40.5%)= 0.405 [4]; and d = the precision used, which was 5%. Applying these values in the equation, the sample size is 368.6. By adding an extra population to avoid bias and missing data, it will be 500 pharmacists.

Result

Among the 500 participants, their mean age was 35.8±13.1 years from four provinces: Karbala, Najaf, Diwaniya, and Hila.

Table 1: Demographic data for the study participants

Based on the percentages in the table, here is a comparison of the different categories ranked from highest to lowest:

.Not undergoing surgery: 96.6% compared to 3.4% who had surgery .1

(.The highest percentage is for those who did not undergo surgery) →

.Non-smokers: 71.4% compared to 28.6% who are smokers .2

(.The highest percentage is for non-smokers) →

.Not taking medications: 71.2% compared to 28.8% who take medications .3

(.The highest percentage is for those who do not take medications) →

.Engaging in exercise: 55.2% compared to 44.8% who do not exercise .4

(.The highest percentage is for those who exercise) →

.Following a diet with medication: 55.8% compared to 44.2% who do not .5

(.The highest percentage is for those who follow a diet with medication) →

.Education level (college degree): 56.4% compared to other education levels .6

(.The highest percentage is for those with a college degree) →

.Not following a diet-only plan: 87.2% compared to 12.8% who follow a diet-only plan .7

(.The highest percentage is for those who do not follow a diet-only plan) →

Overall, the highest percentages were recorded for:

Individuals who did not undergo surgery (96.6%) •

Non-smokers (71.4%) •

Individuals who do not take medications (71.2%) •

Those with a college degree (56.4%) •

Those who follow a diet with medication (55.8%) •

	Frequency	Percent
Governance		
Karbala	125	25.0
najaf	125	25.0
hilla	125	25.0
diwanya	125	25.0
Total	500	100.0
Gender		
Female	265	53.0

Male	235	47.0
Smoking status		
Current smoker	143	28.6
None smoker	357	71.4
Exercise		
Yes	276	55.2
no	224	44.8
physiccal.activity.intensity		
none	218	43.6
low	143	28.6
meduim	106	21.2
high	33	6.6
Educational level		
none	25	5.0
primary	64	12.8
college	94	18.8
college	282	56.4
higher education	35	7.0
Diet only		
yes	64	12.8
no	436	87.2
Surgery		
yes	17	3.4
no	483	96.6

medications		
yes	144	28.8
no	356	71.2
Diet with medication		
Yes	279	55.8
No	221	44.2

Table 2: medications used by the participants

Based on the table, the weight-loss medications can be compared based on their usage percentages among participants as follows:

Orlistat - 25.6% of participants use it, making it the most commonly used medication among .1 .those listed

.Metformin - 22.4% of participants use it, ranking second after Orlistat .2

.Semaglutide - 12.8% of participants use it .3

.Liraglutide - 12.0% of participants use it .4

.Tirzepatide - 8.2% of participants use it .5

.Phentiramine - 3.0% of participants use it .6

.Naltrexone - 1.8% of participants use it, making it the least commonly used medication .7

Comparison Analysis:

- ,Orlistat is the most commonly used medication among participants, with 25.6% usage .indicating that it is the most well-known or frequently prescribed for weight loss
- Metformin follows at 22.4%, commonly prescribed for diabetes but also known for aiding .weight management
- GLP-1 receptor agonists, such as Semaglutide (12.8%), Liraglutide (12.0%), and Tirzepatide .show moderate usage but are effective for weight loss ,(%8.2)
- Phentiramine and Naltrexone are the least used, possibly due to side effects or the availability .of more effective alternatives

Based on this data, Orlistat and Metformin are the most used, while Naltrexone is the least used for weight loss among participants.

	Frequency	Percent
semaglutide		
Yes	64	12.8
No	436	87.2
Metformin		
Yes	112	22.4
No	388	77.6
Orlistat		
Yes	128	25.6
No	372	74.4
phentiramine		
Yes	15	3.0
No	485	97.0
naltrixon		
Yes	9	1.8
No	491	98.2
liraglutide		
Yes	60	12.0
No	440	88.0
tirazeptide		
Yes	41	8.2
No	459	91.8

Table 3: medical conditions for the study participants

Based on the table, the side effects of weight loss medications can be compared in terms of percentages as follows:

Major Side Effects and Health Issues:

1. Diabetes Mellitus (DM)

• 21.0% of participants have diabetes.

• 79.0% do not have diabetes.

2. Hypertension

• 15.8% of participants have high blood pressure.

• 84.2% do not have hypertension.

3. Stopping Medication Due to Side Effects (SE Stop Medication)

• 34.4% of participants had to discontinue the medication due to side effects.

• 65.6% did not face any issues requiring them to stop the medication.

4. Nausea

• 15.8% of participants experienced nausea.

• 84.2% did not experience it.

5. Vomiting

• 6.6% experienced vomiting as a side effect.

• 93.4% did not experience it.

6. Dizziness

• 8.4% of participants experienced dizziness.

• 91.6% did not experience dizziness.

7. Weight Gain When Stopping the Medication

• 6.0% noticed weight gain after stopping the medication.

• 94.0% did not face this issue.

8. Financial Issues Related to Treatment

• 27.2% of participants found the financial cost to be a problem.

• 72.8% did not have financial concerns.

9. Food Craving

• 24.0% of participants experienced increased food cravings.

• 76.0% did not have this issue.

10. Other Health Factors

• 26.8% experienced other health issues related to the medication.
• 73.2% did not experience additional health problems.

Comparison Analysis:

• The most common side effect was stopping medication due to side effects (34.4%), followed by financial issues (27.2%) and other health-related factors (26.8%).
• Diabetes (21.0%) was more common than hypertension (15.8%) among participants.
• Nausea (15.8%) and dizziness (8.4%) were more common than vomiting (6.6%) and weight gain after stopping the medication (6.0%).
• The least common side effect was weight gain after stopping the medication (6.0%), indicating that most users did not experience weight rebound after discontinuation.

Conclusion:

• Diabetes and hypertension were present in a significant proportion of participants, indicating that many individuals use weight loss medications while managing chronic conditions.
• The most concerning side effects were financial burden, other health-related factors, and stopping the medication due to side effects.
• Issues such as nausea, vomiting, and dizziness were present but at lower rates.
• Weight gain after stopping the medication was the least reported issue.

This analysis helps in understanding the impact of weight loss medications on patients and highlights areas that may require monitoring and management.

	Frequency	Percent
DM		
Yes	105	21.0
No	395	79.0
Hypertension		
Yes	79	15.8
no	421	84.2
Stop medication due to SE		
No	328	65.6

Yes	172	34.4
Specify	497	None
Nausea		
Yes	79	15.8
No	421	84.2
Vomiting		
Yes	33	6.6
No	467	93.4
Dizziness		
Yes	42	8.4
No	458	91.6
Weight gain when stop		
Yes	30	6.0
No	470	94.0
Financial		
Yes	136	27.2
No	364	72.8
Food craving		
Yes	120	24.0
No	380	76.0
Health factors		
Yes	134	26.8
No	366	73.2

Discussion

The findings of this study provide valuable insight into the use of weight-loss medications among individuals with obesity across four provinces in Iraq. The results indicate that 28.8% of the participants reported using medications for weight loss, with the most commonly used drugs being Orlistat (25.6%), Metformin (22.4%), Semaglutide (12.8%), and Liraglutide (12.0%). Other medications, such as Phentermine, Naltrexone, and Tirzepatide, were used by a smaller percentage

of participants. Additionally, 34.4% of users discontinued their medication due to side effects, highlighting concerns regarding tolerability.

Comparison with Other Studies

The prevalence of medication use in this study aligns with findings from global research on pharmacologic interventions for weight loss. A systematic review by Khera et al. (2016) found that Orlistat, Liraglutide, and Phentermine-Topiramate were among the most widely prescribed weight-loss medications, with varying degrees of effectiveness and adherence rates. The current study's findings corroborate this, as Orlistat was the most frequently used medication, likely due to its availability and non-systemic action, which makes it a safer option for many users.

Semaglutide and Liraglutide, both GLP-1 receptor agonists, have been gaining popularity in weight management due to their proven efficacy. Studies such as Wilding et al. (2021) demonstrated that Semaglutide led to significant weight loss compared to placebo, with up to 15% of body weight reduction. In our study, 12.8% of participants used Semaglutide, a figure comparable to other regional studies assessing its uptake among obese populations. However, the adherence rate to GLP-1 receptor agonists may be influenced by side effects, such as nausea and vomiting, which were reported in 15.8% and 6.6% of participants, respectively. A study by Davies et al. (2021) similarly reported that gastrointestinal side effects were the most common reason for discontinuation.

The relatively lower usage of Phentermine (3.0%) and Naltrexone (1.8%) aligns with trends seen in European and Middle Eastern populations, where these medications are prescribed less frequently compared to the United States, where Phentermine remains a first-line pharmacological option for obesity management (Yanovski & Yanovski, 2014). This discrepancy may be due to regulatory restrictions, physician prescribing habits, and concerns about side effects such as increased blood pressure and insomnia.

Financial burden was a significant reason for discontinuation in 27.2% of cases, a finding consistent with studies from developing regions where medication costs pose a barrier to adherence. For instance, a study by Wharton et al. (2020) emphasized that cost-related factors heavily influence the continuation of obesity pharmacotherapy, particularly in the absence of insurance coverage.

Implications and Limitations

This study provides critical insights into the real-world use of weight-loss medications in Iraq. The observed medication trends, adherence rates, and side effects highlight the need for improved patient education and support for sustainable weight-loss strategies. The findings also emphasize the importance of financial accessibility in ensuring long-term adherence to obesity treatments.

However, there are limitations to this study. First, the cross-sectional design prevents the assessment of long-term medication efficacy and adherence patterns. Second, self-reported data may introduce recall bias, particularly regarding medication use and side effects. Future longitudinal studies with objective measurements of weight loss and metabolic outcomes could provide a more comprehensive understanding of the effectiveness and sustainability of these treatments.

Conclusion

In summary, this study sheds light on the most commonly used weight-loss medications among individuals in Iraq and identifies key factors influencing their use and discontinuation. The findings are consistent with international research but also highlight region-specific challenges such as financial constraints and medication accessibility. Future efforts should focus on optimizing obesity management strategies, ensuring affordability, and addressing patient concerns about side effects to enhance adherence and improve health outcomes.

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