Budget Impact Analysis for Semaglutide, Tirzepatide, and Dulaglutide for Type 2 Diabetes Mellitus Management in Saudi Arabia

Al-Omar H[1], Almodaimegh H[2], Omaer A[3], Alzubaidi L[4], Alharbi B5, Al harbi E[6], Hassan M[7], Akhtar O[8]

(1) College of Pharmacy, King Saud University, Riyadh, Saudi Arabia, (2) National Guard Health Affairs, Riyadh, Saudi Arabia, (3) King Saud Medical City, Riyadh, Central, Saudi Arabia, (4) Ministry of Health, Riyadh, Saudi Arabia, (5) Prince Sultan Military Medical City, Riyadh, Saudi Arabia, (6) Jeddah Military Hospital, Jeddah, Saudi Arabia, (7) Novo Nordisk, Riyadh, Saudi Arabia, (8) Poa Alpina Research, Seoul, Korea, Republic of (South)

EE74

Introduction

- The Gulf region, particularly Saudi Arabia, has seen type 2 diabetes (T2DM) prevalence nearly triple over the past 30 years, reaching rates of 18.4–28% nationally. Saudi Arabia is now among the top 10 countries worldwide for T2DM prevalence [1-3].
- Poor control of T2DM has notable humanistic and economic impacts, including increased microvascular and macrovascular complications, reduced quality of life, and rising healthcare costs, emphasizing the need for effective management strategies.[4-5] T2DM management has evolved to emphasize not only glycemic control but also weight management and cardiovascular (CV) risk reduction, as highlighted in guidelines from the ADA/EASD, ADA Standards of Care, and American Heart Association.[6-9]
- In this context, GLP-1 receptor agonists (GLP-1 RAs) and the new GLP-1 RA/GIP molecule, tirzepatide, are promising therapeutic options. Some GLP-1 RAs offer additional benefits beyond glycemic control, such as CV and weight loss benefits, and are increasingly used post-metformin or as first-line treatments for patients with CV risk factors.[10]
- Semaglutide and dulaglutide have established CV indications across various regulatory regions, but tirzepatide's CV benefits are still under review, adding to the decision-making complexity. Given the high prevalence of T2DM in Saudi Arabia, the varying profiles of GLP-1 RA and GLP/GIP molecules, and pricing differences, this study assesses the financial impact of semaglutide, tirzepatide, and dulaglutide through a budget impact analysis (BIA).[11-12]
- This analysis supports Saudi Arabia's Vision 2030 initiative to ensure health technology value for money and affordability.

Methodology

- A prevalence-based budget impact model was created using Excel for adults with T2DM in Saudi Arabia. The model calculates the projected national-level costs across three medication regimens over a five-year period, using annual cycles and a half-cycle correction. It was designed following ISPOR BIA guidelines, and inputs were validated by local clinical and health economics experts.
- **Perspective and Time Horizon:** The BIA takes the perspective of the Saudi public healthcare payer over a five-year time horizon, focusing solely on direct medical costs.
- **Interventions and Market Share Assumptions:** The analysis evaluates three treatments: semaglutide, tirzepatide, and dulaglutide, each considered separately under a 100% market share scenario due to Saudi Arabia's public sector procurement practices.
- **Clinical Inputs:** HbA1c reduction input parameters were derived from pivotal Randomized Controlled Trials (RCTs) [13-14]. Incidence rates for developing CV events e.g., CV death, non-fatal stroke, and non-fatal MI were obtained from T2DM-specific epidemiologic studies [15-17]. CV risk reduction hazard ratios were integrated into the model. Weight loss data for each treatment were included, with links to reduced incidence of comorbidities based on a Saudi-specific simulation study.
- **Unit Costs:** Saudi-specific sources were used to calculate drug and complication costs, with categories covering care costs by HbA1c level and costs for T2DM complications.
- **Sensitivity Analyses:** One-way sensitivity analysis (OWSA) tested the robustness of key parameters. Price comparisons between GLP-1 RAs and tirzepatide were included to assess break-even points, and probabilistic sensitivity analysis (PSA) explored budget uncertainties through varying inputs.
- The model was validated by internal and external experts, including health economists and pharmacists in Saudi Arabia, with checks on assumptions, formulas, and model performance to ensure alignment with the decision problem.

Results

- The budget impact analysis shows the 5-year financial implications of three treatments for type 2 diabetes in Saudi Arabia: semaglutide ($85.9 million), tirzepatide ($169.8 million), and dulaglutide ($94.6 million). Table 1

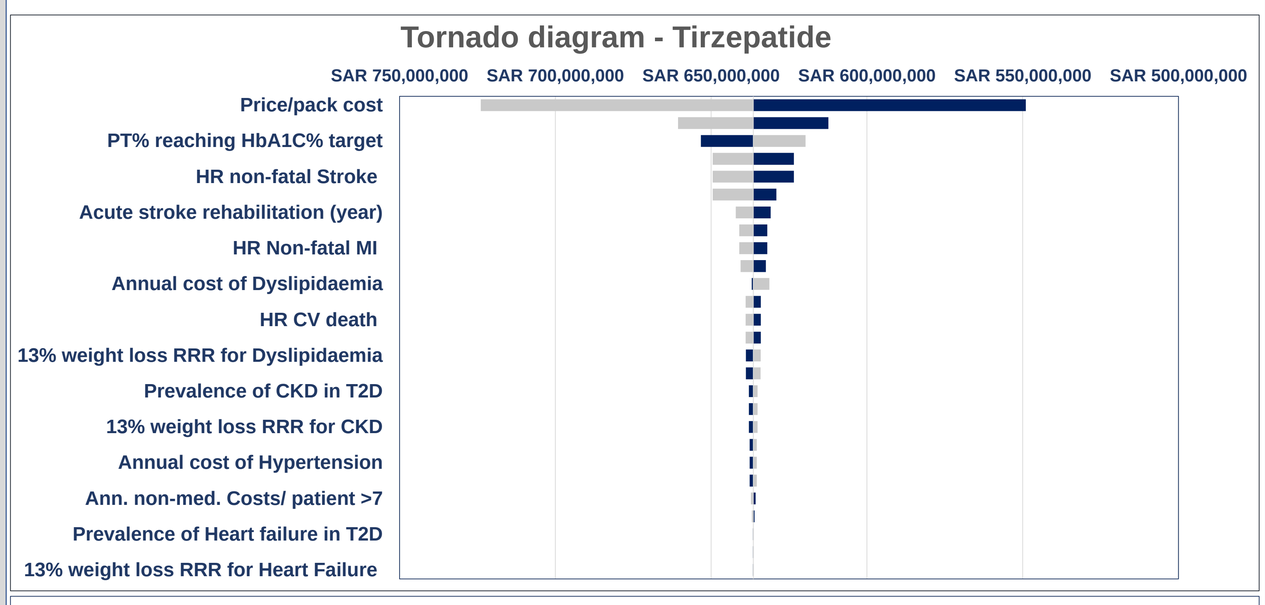
Cost category	Semaglutide	Tirzepatide	Dulaglutide
Medication costs (Year 1)	$3,503,077	$12,254,648	$3,520,758
Medication costs (Year 5)	$9,820,791	$34,355,609	$9,870,359
Medication costs (Total)	**$33,349,253**	**$116,664,120**	**$33,517,578**
Diabetes management (Year 1)	$3,541,660	$3,487,168	$3,742,527
Diabetes management (Year 5)	$9,928,958	$9,776,190	$10,492,083
Diabetes management (Total)	**$33,716,563**	**$33,197,800**	**$35,628,815**
CV complications (Year 1)	$1,718,130	$1,949,902	$2,051,139
CV complications (Year 5)	$7,714,500	$9,192,324	$9,374,112
CV complications (Total)	**$22,625,947**	**$26,623,928**	**$27,366,964**
Weight reduction savings (Year 1)	$395,869	$703,325	$152,410
Weight reduction savings (Year 5)	$1,109,810	$1,971,755	$427,278
Weight reduction savings (Total)	$3,768,672	$6,695,646	$1,450,942

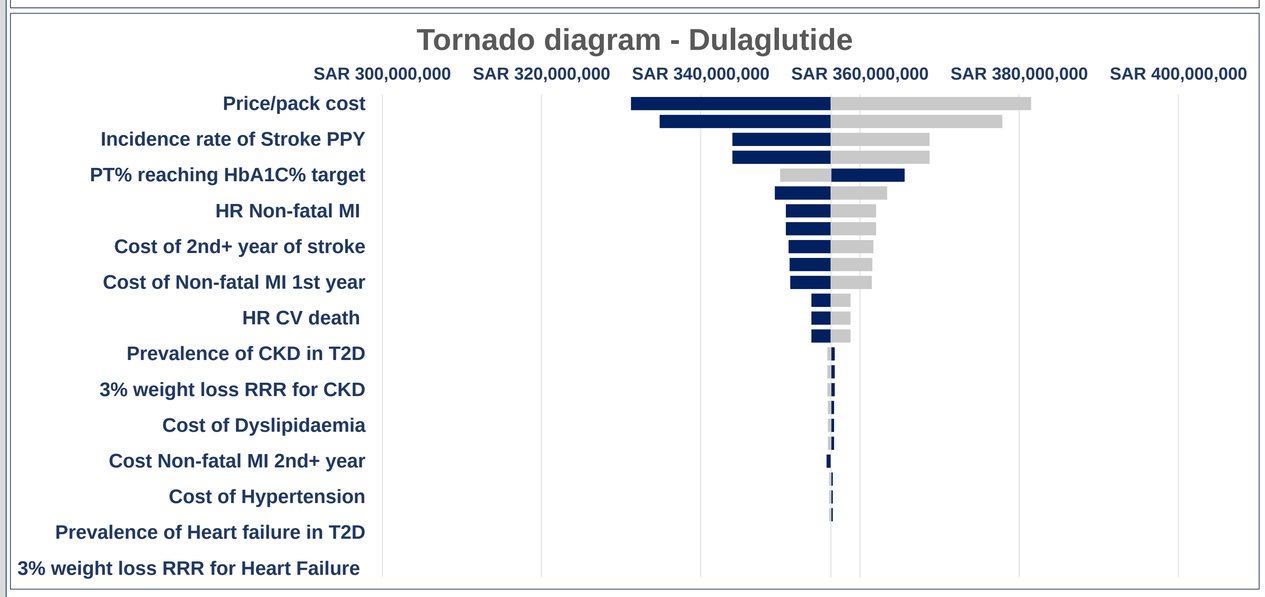
Table 1 Cumulative budget impact outcomes for the three comparators.

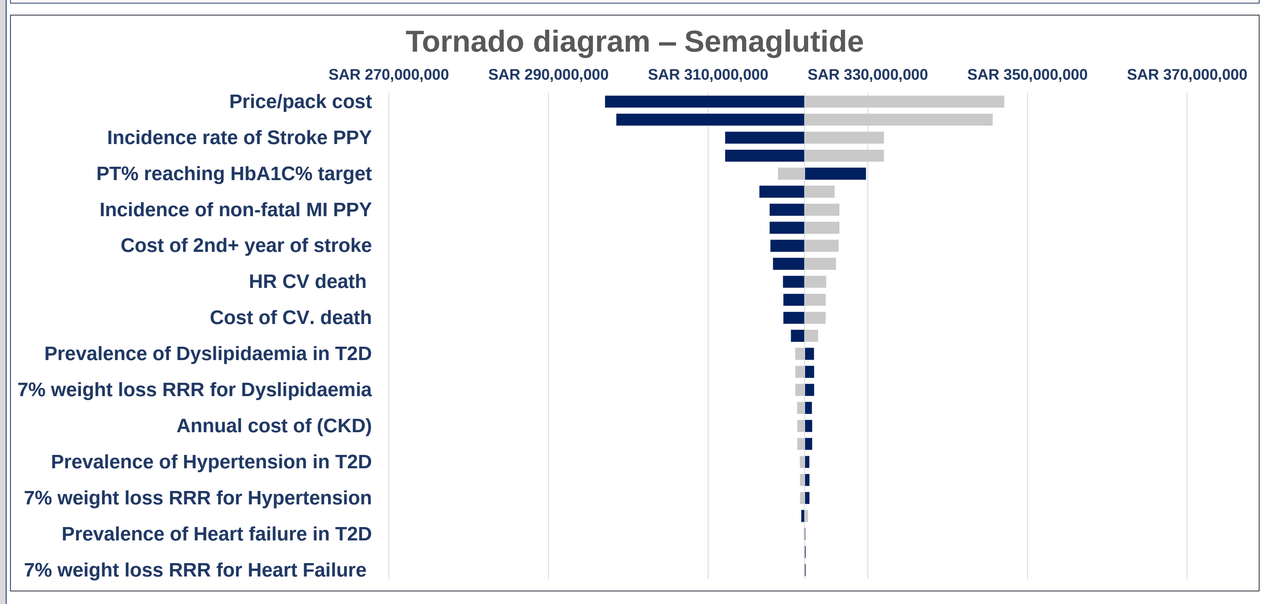
- A breakeven analysis suggests that for tirzepatide to be cost-equivalent to semaglutide, its price must be reduced by $199.91 per pack from its current list price. This reduction is needed despite tirzepatide's benefits in HbA1c reduction and weight loss, as shown in the SURPASS-2 trial 13. Additionally, tirzepatide would achieve cost parity with dulaglutide at a price $20.01 above dulaglutide's price, and dulaglutide would need a price cut of $18.67 per pack to match the budget impact of semaglutide.

Sensitivity Analyses:

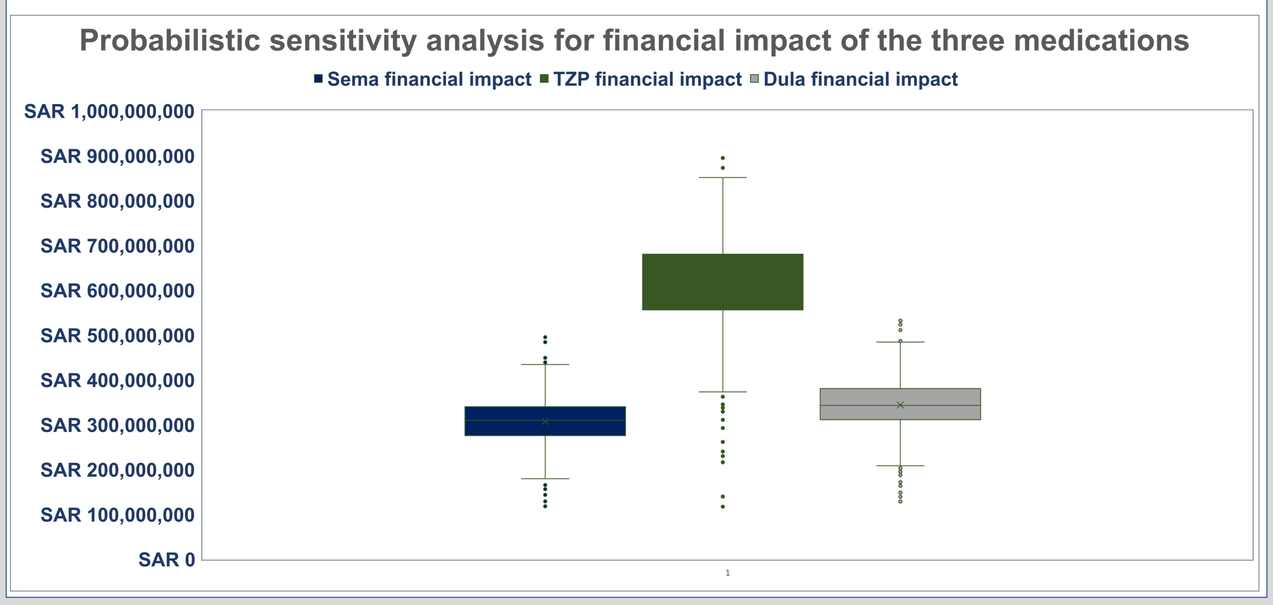
The sensitivity analysis revealed that all three treatments—semaglutide, tirzepatide, and dulaglutide—are most sensitive to changes in pack price, annual non-medication costs, proportion of patients reaching HbA1c targets, incidence of non-fatal stroke, and stroke hazard ratio. Price-per-pack had the highest impact on financial variability. Tirzepatide showed the largest financial variation, with a range of $46.5 million (31.8%) around its base case, indicating it's most affected by these key parameters.







- In the probabilistic sensitivity analysis (PSA) with 1,000 simulations, financial impact distributions for each treatment were generated, showing median costs of $82.7 million (semaglutide), $91.6 million (dulaglutide), and $164.6 million (tirzepatide). Semaglutide had the most stable financial impact, with a narrower range around its median, suggesting lower variability in budget outcomes compared to the other options.



Conclusion

the budget impact analysis suggests semaglutide as the most favorable option for managing T2DM in Saudi Arabia. Its cost-offsets related to cardiovascular outcomes, alongside acquisition costs, make it a preferred choice over tirzepatide. Although semaglutide and dulaglutide are similarly priced, semaglutide offers additional benefits in cardiovascular and diabetes management, along with weight-loss savings. Overall, semaglutide appears to be a more cost-effective solution compared to both dulaglutide and the newer GLP/GIP agent tirzepatide.

References

Scan me