Evaluating the Economic Burden of Therapeutic Inertia in People With Type 2 Diabetes in Saudi Arabia

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Introduction

Type 2 diabetes (T2D) is a chronic metabolic disease characterized by elevated blood glucose levels, affecting over 536 million people worldwide in 2021—nearly 10% of the age-adjusted population.[1] In Saudi Arabia, the prevalence is even higher, impacting more than 16% of the population and resulting in healthcare expenditures of $7.5 billion in 2021.[1,2]

Studies such as the UKPDS, ACCORD, and ADVANCE have demonstrated that short-term reductions in HbA1c reduce the incidence of long-term diabetes-related complications. This not only improves patients' quality of life but also reduces healthcare costs.[3,4,5,6,7] In the KSA, higher HbA1c levels are associated with increased medical expenses, underscoring the need for effective therapies to lower blood glucose levels.[8] Consequently, treatment guidelines emphasize controlling HbA1c as a key goal for people with T2D.[9,10]

Over the past decade, modern treatments such as SGLT-2 inhibitors and GLP-1 receptor agonists have been developed. These therapies offer high efficacy and low risks of hypoglycemia. [9] As a result, treatment options for T2D are now more extensive and effective than ever before. However, many patients experience therapeutic inertia—the failure to intensify treatment promptly when needed, such as during poor glycemic control.[11] Therapeutic inertia is a significant issue in KSA; studies indicate that only 15% of physicians prescribe GLP-1 receptor agonists at the appropriate time.[12,13] There is a particularly high level of inertia when initiating injectable therapies, with barriers including fear of injections, lack of patient education, fear of hypoglycemia, and difficult administration.[11,12,14,15] Physicians also show reluctance to initiate insulin due to patient-related factors including expected non-adherence and patient refusal.[13]

Addressing therapeutic inertia could improve patient outcomes and reduce overall healthcare costs in KSA.[16] Previous analyses in the US, UK, and Sweden have shown that short-term reductions in HbA1c can substantially impact life expectancy and costs.[17,18,19] Given the significant burden of T2D in KSA and the high level of therapeutic inertia, the present analysis aims to evaluate the health and economic burden associated with therapeutic inertia and delayed achievement of HbA1c targets in a Saudi-specific cohort with inadequate glycemic control on first- or second-line therapy.

Methodology

Choice of model and approach

The IQVIA Core Diabetes Model (version 9.0; IQVIA, Basel, Switzerland) was utilized to project health and economic outcomes in this study. The model's structure, functions, assumptions, and capabilities have been detailed in previous studies, including two model validations.[20,21,22] Outcomes were projected over various time horizons, discounted at an annual rate of 3.0% in line with KSA guidelines, and calculated using the UKPDS 68 risk equations.[23,24] Background mortality rates were obtained from KSA-specific life tables published by the WHO.[25] All analyses were conducted using a first-order Monte Carlo approach.

Modeled scenarios and parameter progression

Scenarios were designed to reflect varying levels of poor glycemic control and therapeutic inertia in KSA, with different time horizons to capture healthcare payers' interests. Variations included three baseline HbA1c levels (8.0%, 9.0%, and 10.0%), five delays in achieving the target HbA1c of 7.0% (1–5 years), and six time horizons (3, 5, 7, 10, 15, and 50 years). Target HbA1c was defined as 7.0% based on KSA clinical guidelines.[10] Patients were modeled to achieve this target either immediately (within the first year) or after a delay of 1–5 years. HbA1c levels were assumed to remain constant throughout the analyses, and other physiological parameters including blood pressure, serum lipid levels, and BMI were kept constant. No hypoglycemic event rates were applied.

Baseline cohort characteristics

Baseline cohort characteristics were sourced from Saudi-specific data, representing patients with inadequate glycemic control on first- or second-line therapy (Table 1) A cohort of 2,226 patients were originally captured, with data extracted for a subpopulation of 638 patients with an available baseline HbA1c ≥6.5% and receiving at least one treatment with a non-missing start date. First- and second-line therapy captured a range of medications, including metformin (82% of patients), sulfonylureas (52%), thiazolidinediones (0.3%), dipeptidyl peptidase-4 (DPP-4) inhibitors (44%), SGLT-2 inhibitors (3%), GLP-1 receptor agonists (4%), and insulin therapies (1–20%).

Cost and utilities

All analyses were performed from a societal perspective, capturing direct costs of treating diabetes-related complications informed by published sources and indirect costs associated with lost workplace productivity calculated via a human capital approach based on Saudi-specific salaries and days off work estimates. No acquisition costs relating to antidiabetic medications were included in the analyses. Health-state utilities and event-based disutilities relating to quality of life were sourced from a 2014 systematic review by Beaudet et al., which informs the default utility set in the IQVIA Core Diabetes Model. [26]

Table 1: Baseline cohort characteristics applied in analyses

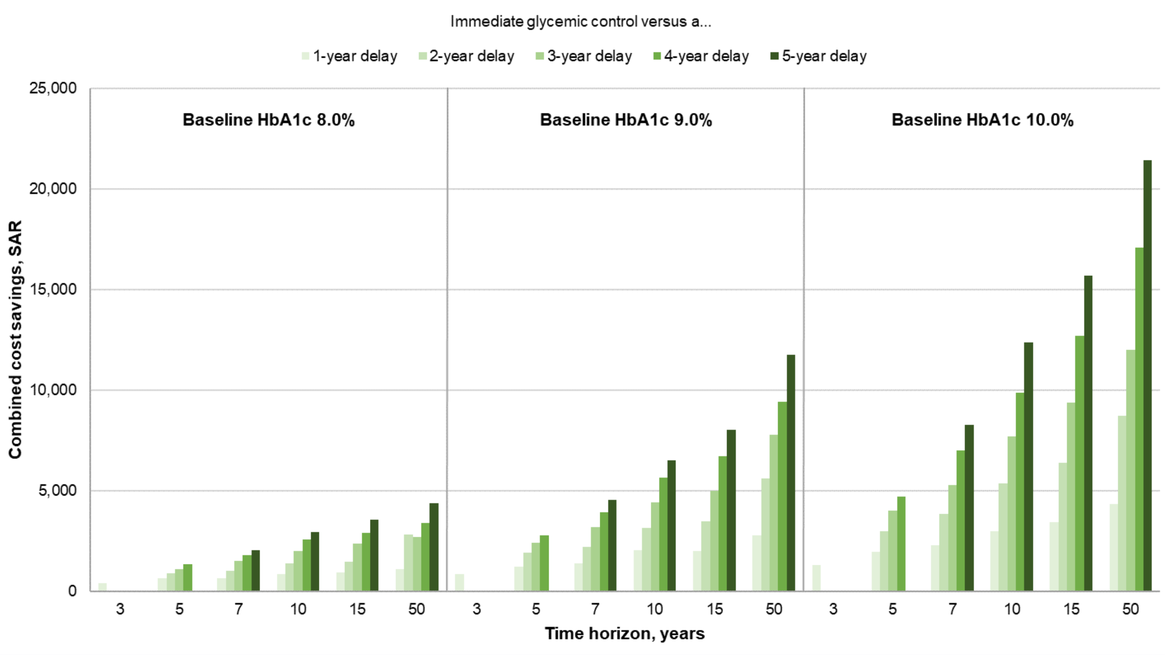
Characteristic	Mean (SD)
Age, years	49.1 (11.6)
Duration of diabetes, years	0.0 (0.0)†
Male, %	49.5
HbA1c, %	8, 9 or 10
Systolic blood pressure, mmHg	134.1 (17.9)
Diastolic blood pressure, mmHg	79.4 (9.8)
Total cholesterol, mg/dL	191.8 (46.6)
HDL cholesterol, mg/dL	43.7 (14.5)
BMI, kg/m²	30.5 (6.1)
Smokers, %	10.3

Results

Cost outcomes

Delaying therapy intensification significantly increases the economic burden of type 2 diabetes in KSA. Immediate glycemic control leads to cost savings by preventing diabetes-related complications. Per-patient savings ranged from SAR 411 to SAR 21,422, increasing with higher baseline HbA1c levels (8.0%, 9.0%, 10.0%) and longer time horizons (3 to 50 years). Overall, greater cost savings were observed with higher HbA1c levels, longer delays in achieving target HbA1c, and extended time horizons (Figure 1).

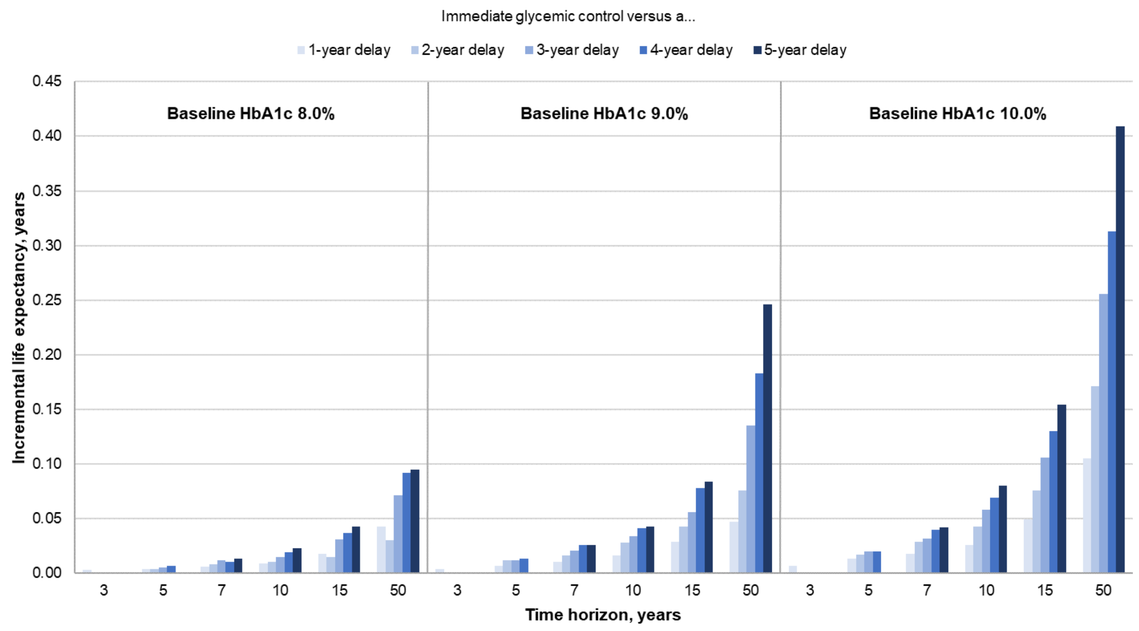
Figure 1: Per-patient cost savings projected in the analyses



Life expectancy outcomes

Delaying glycemic control significantly impacts patient outcomes in KSA. Immediate control led to equal or improved life expectancy in all scenarios compared to poor control, with gains ranging from 0.01 to 0.41 additional years per patient. Improvements were more pronounced with higher baseline HbA1c levels, longer delays in achieving target HbA1c, and over extended time horizons (Figure 2). These results underscore the importance of prompt glycemic management to reduce diabetes-related complications and enhance life expectancy.

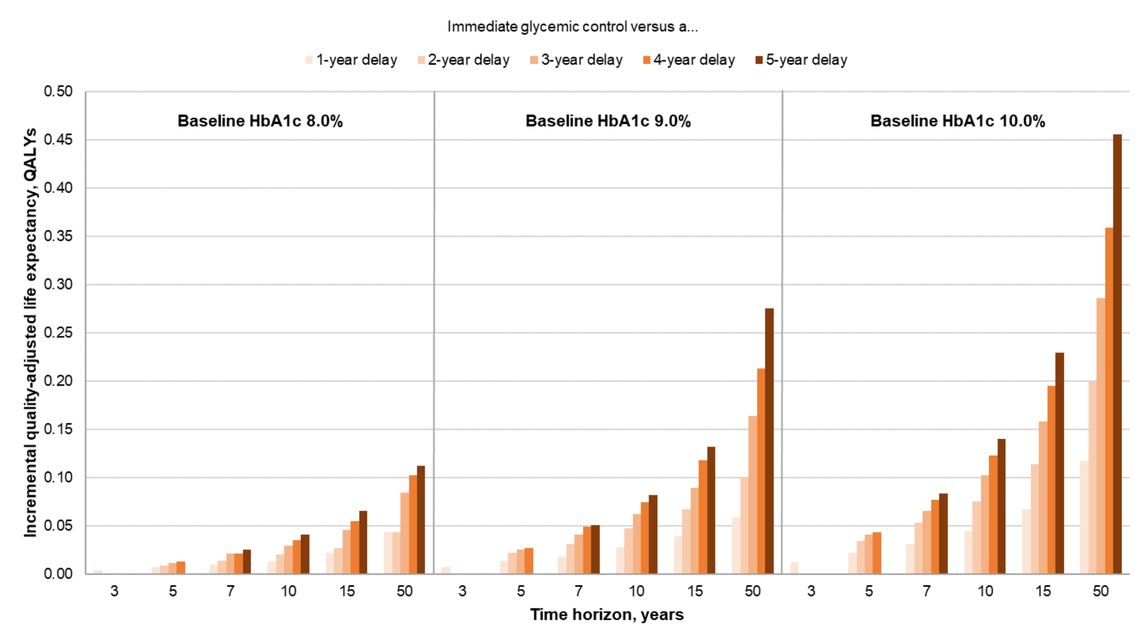
Figure 2: Incremental per-patient life expectancy projected in the analyses



Quality-of-life outcomes

Immediate glycemic control significantly improves quality-adjusted life expectancy (QALYs) in KSA compared to delayed control (Figure 3). Except for one scenario, all analyses showed increased QALYs with immediate control, with per-patient gains ranging from 0.01 to 0.46 QALYs. Improvements were more pronounced with higher baseline HbA1c levels, longer delays in achieving target HbA1c, and over longer time horizons. For example, at a baseline HbA1c of 8.0%, immediate control resulted in an additional 0.03 QALYs over a 10-year horizon versus a 3-year delay, and 0.11 QALYs over a 50-year horizon versus a 5-year delay. Similarly, with a baseline HbA1c of 9.0%, gains ranged from 0.01 QALYs over a 3-year horizon versus a 1-year delay to 0.28 QALYs over a 50-year horizon versus a 5-year delay.

Figure 3: Incremental per-patient quality-adjusted life expectancy projected in the analyses



Discussion

Therapeutic inertia in T2D, especially in KSA, remains a significant challenge due to patients' aversion to injectable therapies. Studies have shown that patients prefer oral medications or less frequent injections, which improve quality of life and adherence.[27-29] Enhancing patient and physician education about the efficacy and safety of novel administration methods—such as once-daily oral GLP-1 receptor agonists and once-weekly injectables—could reduce therapeutic inertia and improve diabetes management in the region.[30-33]

This study is among the first in West Asia to evaluate the burden of poor glycemic control due to therapeutic inertia. With KSA's shift towards a value-based approach, there's an increased emphasis on cost-effective therapies that offer convenient administration options. The low usage rates of modern antidiabetic medications such as SGLT-2 inhibitors and GLP-1 receptor agonists highlight the potential for significant improvements in patient outcomes and healthcare cost savings through wider adoption of these treatments.

While the analysis focused solely on changes in HbA1c levels, it acknowledges that modern diabetes treatments provide additional benefits such as weight loss and reduced risk of hypoglycemia. These multifactorial advantages suggest that actual cost savings and quality-of-life improvements may be underestimated. The study underscores the importance of early diagnosis and prompt glycemic control to reduce long-term complications and healthcare expenditures, advocating for therapies that address therapeutic inertia without increasing overall costs.

Conclusion

Projections over the short and long term associated prolonged periods spent in poor glycemic control due to therapeutic inertia with poorer clinical outcomes and an increased economic burden compared with immediate control of bringing HbA1c to target levels in KSA. Interventions and initiatives that can reduce therapeutic inertia and achieve improved glycemic control in the country should provide crucial benefits for patients and cost savings for healthcare payers.

References