

# Impact of dapagliflozin on weight and BMI in Omani patients with type 2 diabetes: a strategy for enhancing metabolic health

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## ABSTRACT

**Background:** Sodium-glucose cotransporter-2 inhibitors (SGLT2 inhibitors) work by inhibiting glucose reabsorption in the kidneys' proximal tubules. This process helps lower plasma glucose levels, reduce body weight, and decrease cardiovascular risk in patients with type 2 diabetes mellitus (T2DM). **Aim:** This study evaluates the impact of dapagliflozin, a sodium-glucose cotransporter-2 (SGLT2) inhibitor, on body weight and BMI in Omani patients with type 2 diabetes mellitus (T2DM). **Methodology:** A retrospective pre-post cohort study was conducted at Diwan Polyclinic, Muscat, enrolling 124 T2DM patients between January 2020 and December 2022. Patients who used dapagliflozin for at least 24 months were included. Medical records were analyzed for weight and BMI changes. Statistical analyses included paired *t*-tests, two-way ANOVA, and chi-square tests to assess differences across gender and treatment regimens. **Results:** The mean age of participants was 61 years, with 50.8% being female. At baseline, 47.6% were obese, with an average BMI of 30.49 kg/m<sup>2</sup>. After two years of dapagliflozin treatment, patients experienced significant weight loss (-3.43 kg, 4.45% reduction) and a decrease in BMI to 28.78 kg/m<sup>2</sup>. Females showed greater weight loss (-4.13 kg) than males (-2.77 kg). Weight reduction was independent of treatment regimens. **Conclusion:** Dapagliflozin effectively reduces weight and BMI in T2DM patients, improving metabolic health. Further research is needed to explore long-term outcomes and contributing mechanisms.

## KEYWORDS

dapagliflozin, type 2 diabetes mellitus, body mass index, weight reduction, Oman

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## 1. INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a growing global health burden. It is defined by persistent hyperglycemia caused by insufficient insulin secretion or insulin resistance [1]. In Oman, the number of individuals with T2DM is expected to reach 350,000 by 2050, a 174% increase from 2015 figures [2]. Effective management requires not only achieving glycemic targets but also addressing

obesity, which worsens insulin resistance and increases the risk of complications.

Dapagliflozin is a sodium-glucose cotransporter-2 (SGLT2) inhibitor that improves glycemic control by blocking renal glucose reabsorption, resulting in glucosuria [3]. It is approved for use as monotherapy or in combination with other oral antidiabetic agents [4,5]. Beyond glucose reduction, dapagliflozin promotes weight loss through caloric loss and osmotic diuresis [6]. Evidence also suggests a reduction in visceral fat, particularly among patients inadequately controlled on metformin [6].

This study assesses the effect of dapagliflozin on body weight and body mass index (BMI) in adult Omani patients with T2DM.

## 2. METHODOLOGY

### 2.1. Study setting

This retrospective study was conducted at Diwan Polyclinic, Muscat. It is a specialized government healthcare facility offering endocrine and internal medicine services to 7,376 registered patients.

### 2.2. Study design

A pre-post cohort study design was used. Medical records of patients were reviewed from January 2020 to December 2022.

### 2.3. Study population

The study targeted adult Omani patients diagnosed with type 2 diabetes mellitus (T2DM) who were treated with dapagliflozin for at least 24 months and were exclusively on oral antidiabetic medications. Patients were eligible if they were aged 18 years or older, held Omani nationality, and had a confirmed diagnosis of T2DM. Patients were excluded if they had type 1 diabetes, discontinued dapagliflozin within one year, used injectable diabetes medications such as insulin or GLP-1 receptor agonists, or were prescribed dapagliflozin solely for cardiac indications.

### 2.4. Sampling and sample size determination

Convenient sampling was applied to select eligible patients from the polyclinic's electronic information system using patient registration numbers. The sample size was calculated using Raosoft.com based on a single-population proportion formula. Parameters included a population size of 3,500 patients, a 5% margin of error, a 95% confidence level, and a response distribution of 50%. The min-

imum required sample size was 347 adult Omani patients with type 2 diabetes mellitus.

### 2.5. Data collection

Data on weight and BMI were collected from patient medical records at five distinct time points: 3–12 months before dapagliflozin initiation (control), at baseline (immediately before treatment), and at 3–8 months, 9–16 months, and 17–24 months after starting dapagliflozin therapy.

### 2.6. Statistical analysis

Descriptive statistics were used to summarize baseline characteristics and follow-up measurements. Continuous variables were reported as mean with standard deviation ( $\pm$ SD) and 95% confidence intervals. Paired *t*-tests were conducted to compare weight and BMI before and after treatment. Two-way ANOVA was used to assess weight changes across different timeframes and treatment regimens. Chi-square tests were applied to analyze gender-based differences and their association with glycemic control. A *p*-value of less than 0.05 was considered statistically significant. All analyses were conducted using SPSS version 26.

### 2.7. Ethical considerations

The study was approved by the institutional ethics committee of National University of Science and Technology and from the directorate general of medical services in Oman. Patient confidentiality was maintained throughout.

## 3. RESULTS

The study included 124 patients, comprising 49.2% males and 50.8% females. The mean age was  $61 \pm 8.4$  years, with an age range of 36 to 83 years. At baseline, the average weight was  $76.6 \pm 16.5$  kg (range: 45–139.9 kg). After 24 months of dapagliflozin therapy, the mean weight decreased by 3.43 kg, representing a 4.45% reduction from baseline. The most significant weight loss occurred during the first 3–8 months, with a slower rate of reduction observed between 9 and 24 months, eventually reaching a plateau (Figure 1).

Baseline BMI averaged  $30.49 \pm 6.92$  kg/m<sup>2</sup>, indicating obesity. By the 17–24-month follow-up, the mean BMI decreased to 28.78 kg/m<sup>2</sup>. Female patients experienced greater reductions in both weight and BMI compared to males. The average weight loss in females was 4.13 kg (5.88% BMI reduction), compared to 2.77 kg in males (3.86% BMI reduction).

A repeated-measures ANOVA showed a statistically significant reduction in weight across the four follow-up periods (Wilks' lambda=0.746, F (3,120)=13.286,  $p < 0.001$ ). However, there was

no significant difference in weight reduction across different antidiabetic treatment regimens (Wilks' lambda=0.880, F (3,120)=1.711,  $p = 0.086$ ).



Figure 1. Correlation between CRP levels and certain parameters.

#### 4. DISCUSSION

The findings of this study support existing evidence on the weight-reducing effects of dapagliflozin in patients with type 2 diabetes mellitus (T2DM). After 24 months of therapy, patients in this cohort experienced a mean weight loss of 3.43 kg, consistent with previous studies reporting similar outcomes. For example, a retrospective cohort study involving 289 T2DM patients showed that 45.6% achieved a significant weight reduction of approximately 4 kg over 12 months, while the remaining 54.4% showed minimal or no change [7].

The DECLARE-TIMI 58 trial also demonstrated favorable outcomes, particularly among obese patients (BMI  $\geq 30$  kg/m<sup>2</sup>), where dapagliflozin use led to both weight loss and lower hospitalization rates due to heart failure and atrial fibrillation [8]. In our study, the baseline BMI indicated obesity (mean 30.49 kg/m<sup>2</sup>), which shifted into the overweight range (mean 28.78 kg/m<sup>2</sup>) after 24 months, suggesting a clinically relevant change.

Weight reduction was most notable during the first 3–8 months, aligning with the pattern observed in other studies, where the majority of weight loss occurs early and then plateaus over time. Although female patients showed greater re-

ductions in weight and BMI compared to males, previous literature indicates that gender is not a consistent predictor of weight response [9]. Other factors, such as physical activity, metformin use, and normal renal function, have been shown to significantly influence outcomes, while variables like age, BMI, alcohol intake, smoking, hypertension, and dyslipidemia appear to have limited impact [9].

A retrospective study reported an average weight loss of 3.4 kg after 12 months of dapagliflozin therapy, further validating our findings [10]. The similarity in weight reduction magnitude supports the potential of dapagliflozin as a safe and effective agent for promoting weight loss in real-world settings, particularly when used as part of a long-term management plan for T2DM.

Overall, these results confirm dapagliflozin's role in reducing body weight and BMI among Omani patients with T2DM, with the greatest benefit observed early in treatment. This has important implications for clinical practice, highlighting the need for early initiation and monitoring to maximize therapeutic benefit.

This study had several limitations. First, lifestyle factors such as diet and exercise were not assessed. Second, medication adherence to

dapagliflozin was not evaluated, which may have influenced outcomes. Future studies should incorporate detailed lifestyle assessments and adherence monitoring.

## 5. CONCLUSION

Dapagliflozin demonstrated clinically meaningful reductions in body weight and BMI among Omani patients with T2DM over a 24-month period. The greatest effect occurred during the first 8 months, with sustained impact observed up to two years. Female patients showed a greater response in both weight and BMI reduction compared to males. These findings support the use of dapagliflozin as an effective adjunct therapy in T2DM management, particularly in overweight and obese individuals. Further research should explore the long-term metabolic effects and mechanisms contributing to gender differences in treatment response.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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