



IMPLEMENTATION OF TIME-RESTRICTED EATING IN GLYCEMIC CONTROL IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: A CASE REPORT

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ABSTRACT

Type 2 Diabetes Mellitus (DM) is a chronic metabolic disease characterized by elevated blood glucose levels and requiring long-term self-management to prevent complications. In addition to pharmacological therapy, non-pharmacological strategies such as Time-Restricted Eating (TRE) may support daily blood glucose regulation. This case report aimed to describe short-term changes in blood glucose levels following the implementation of TRE in a patient with type 2 DM. This case report used an Evidence-Based Nursing (EBN) approach. The subject was a 58-year-old man diagnosed with type 2 DM for 10 years, with a body mass index of 26.17 kg/m² and a pre-intervention fasting blood glucose level of 145 mg/dL. The patient continued to be prescribed oral antidiabetic medication during the intervention. TRE was implemented for 3 days with a 10-hour eating window from 10:00 AM to 08:00 PM, without calorie restriction. Blood glucose monitoring included fasting blood glucose, 2-hour postprandial glucose after lunch and dinner, and bedtime glucose levels. Results were obtained by monitoring blood glucose levels and making observations during the TRE intervention, which were then analyzed descriptively by calculating blood glucose levels before and after the intervention. After 3 days of TRE, fasting blood glucose decreased to 83 mg/dL; 2-hour postprandial glucose after lunch was 121 mg/dL, after dinner was 123 mg/dL, and bedtime glucose was 95 mg/dL. No signs or symptoms of hypoglycemia were reported during the intervention. This case report showed a short-term downward trend in blood glucose levels during TRE implementation in a patient with type 2 DM. However, the findings should be interpreted with caution because they were obtained from a single patient over a short intervention period, and medication use, dietary intake, and physical activity were not strictly controlled.

Keywords: blood glucose monitoring; case report; glycemic control; time-restricted eating; type 2 diabetes mellitus

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INTRODUCTION

Type 2 Diabetes Mellitus (DM) is a chronic metabolic disease characterized by persistent hyperglycemia due to impaired insulin secretion, insulin action, or both (Kusuma, 2022). WHO data shows that around 14% of the population aged > 18 years suffers from DM (World Health Organization, 2024). In Indonesia, the prevalence of DM is 2.2%, while in Central Java Province, it is 2.09% in those aged ≥ 15 years (Kemenkes, 2023). The age group that has a high risk of experiencing type 2 diabetes is the age group between 40 and 60 years (Nurgajayanti et al., 2024). Type 2 DM is associated with several risk factors, including excess body weight, physical inactivity, unhealthy dietary patterns, and genetic predisposition (World Health Organization, 2024). Patients with type 2 DM require consistent self-management to maintain stable blood glucose levels. If blood glucose levels are not adequately controlled over time, patients are at risk of developing complications, including neuropathy and cardiovascular disease (Brown et al., 2023).

Prevention of complications in DM patients can be achieved by controlling blood glucose levels through a healthy lifestyle, including diet, physical activity, regular blood glucose monitoring, and consistent medication use (Ramadhani et al., 2025). Diet is an important step in controlling blood

glucose levels to reduce the risk of complications (The Diabetes and Nutrition Study Group, 2023). However, long-term adherence to dietary recommendations remains challenging for many patients with type 2 DM, particularly when dietary management requires continuous calorie restriction, food selection, and consistent behavioral control (Tirfessa et al., 2023). Therefore, patient understanding, active participation, and health education are important to support diabetes self-management. Health education can improve patients' ability to manage chronic diseases and follow recommended lifestyle interventions (Nurmajid & Kristinawati, 2026).

Time-Restricted Eating (TRE) is a dietary strategy that limits daily food intake to a specific eating window, commonly 4 to 10 hours, followed by a fasting period during which calorie-free beverages are allowed (Manoogian et al., 2022). Unlike conventional calorie-restriction approaches, TRE focuses primarily on the timing of food intake rather than detailed calorie counting, which may make it easier for some patients to understand and apply in daily life (Lu et al., 2026). In patients with type 2 DM, TRE should be implemented carefully because it requires monitoring of clinical condition, blood glucose levels, dietary intake, medication use, and possible signs of hypoglycemia (Awad et al., 2025). Previous studies have reported that TRE may improve glucose homeostasis, insulin sensitivity, body weight, and glucose tolerance in patients with type 2 DM (Andriessen et al., 2022). Other studies have also shown that TRE may reduce fasting blood glucose and improve short-term glycemic parameters (Bravo-garcia et al., 2025).

Although TRE has been studied in metabolic and diabetes-related research, case reports describing its short-term implementation in nursing practice for patients with type 2 DM remain limited. In addition, clinical descriptions of TRE implementation that include daily blood glucose monitoring and safety observation, particularly signs of hypoglycemia, are still needed. The duration and structure of TRE interventions also vary across studies, resulting in different clinical outcomes. Therefore, presenting clinical data from a case report may provide an initial description of how TRE can be applied and monitored in an individual patient with type 2 DM. This case report aimed to describe short-term changes in blood glucose levels during the implementation of TRE as a non-pharmacological nursing intervention in a patient with type 2 DM.

METHOD

This case report used a case report design with an Evidence-Based Nursing (EBN) approach to implement a Time-Restricted Eating (TRE) intervention for a patient with type 2 diabetes mellitus. The EBN approach included identifying the patient's nursing problem, selecting an intervention based on relevant evidence, implementing the intervention, monitoring clinical responses, and evaluating changes in blood glucose. TRE was selected because prior literature has reported its potential to support blood glucose regulation in patients with type 2 DM, and this intervention was considered relevant to the patient's unstable blood glucose levels.

The subject in this case report was a 58-year-old male with a 10-year history of type 2 DM. The patient had a body mass index of 26.17 kg/m² and regularly underwent medical follow-up and took oral antidiabetic medication prescribed by a physician. The subject was selected based on the following criteria: a medical diagnosis of type 2 DM, age 18-70 years, BMI ≥ 24 kg/m², use of fewer than three types of oral antidiabetic drugs, no changes in antidiabetic medication dose within the last 3 months, and no insulin therapy. The patient continued taking oral antidiabetic medication during the intervention, and the medication regimen was not modified as part of this case report.

The nursing intervention was conducted for 3 days, from April 30 to May 2, 2026. The patient received TRE with a 10-hour eating window from 10:00 AM to 08:00 PM. During this window, the patient was allowed to eat meals without specific calorie restrictions. Outside the window, the patient was instructed to fast but could consume calorie-free beverages, such as water, unsweetened tea, or unsweetened coffee. Before implementation, the patient and family received education on the

TRE schedule, the purpose and benefits of the intervention, safe fasting practices, signs and symptoms of hypoglycemia, and initial management of hypoglycemia.

Blood glucose monitoring was conducted during the TRE implementation period. The monitored parameters included fasting blood glucose, 2-hour postprandial glucose after lunch, 2-hour postprandial glucose after dinner, and bedtime glucose levels. Fasting blood glucose was measured at 07:00 AM, 2-hour postprandial glucose was measured after lunch and dinner, and bedtime glucose was measured at 10:00 PM. All blood glucose measurements were performed at the same scheduled times each day to ensure consistent observation.

The instrument used for blood glucose measurement was an Autocheck 3-in-1 GCU glucometer with test strips and lancets, using capillary blood obtained via a fingerstick. In addition, a daily observation sheet recorded blood glucose values, food intake, physical activity, antidiabetic medication intake, adherence to the TRE schedule, and the patient's clinical condition related to possible hypoglycemia. Food intake was assessed by asking the patient about the types and amounts of main meals and snacks consumed during the intervention. Physical activity was assessed by asking whether the patient exercised and whether daily activity patterns remained relatively stable during the intervention. Medication intake was monitored by confirming the time of antidiabetic medication consumption and whether the dose remained unchanged throughout the intervention.

Adherence to TRE was evaluated by confirming with the patient and family whether the patient followed the prescribed eating window. During hypoglycemia monitoring, the patient and family were instructed to observe symptoms such as weakness, trembling, cold sweats, dizziness, and palpitations. If symptoms of hypoglycemia occurred, the patient and family were instructed to provide a readily available source of sugar, such as fruit juice or sugar water, and to seek health assistance if symptoms persisted.

Data were analyzed descriptively by comparing the pre-intervention fasting blood glucose value with blood glucose monitoring results during the 3-day TRE intervention. Food intake, physical activity, and antidiabetic medication use were monitored as potential confounding factors but were not strictly controlled. Before the intervention, the patient received an explanation of the procedure, objectives, benefits, and possible risks, and provided consent to participate in this case report. Patient confidentiality was maintained by anonymizing the patient's identity in the report.

RESULT

Case Illustration

The assessment was conducted on April 29, 2026. The patient was a 58-year-old male with a medical diagnosis of type 2 diabetes mellitus since 2016. The patient had a history of hypertension, heart disease, and glaucoma surgery in 2018. The patient regularly attended hospital follow-up and took Metformin 500 mg three times daily and Gliclazide 80 mg once daily as prescribed by a physician. The patient's general condition was good, with a Glasgow Coma Scale score of 15 (E4V5M6) and a compos mentis level of consciousness. The pre-intervention fasting blood glucose level was 145 mg/dL, and the body mass index was 26.17 kg/m². During the initial assessment, the patient reported increased thirst and frequent urination. TRE was then implemented for 3 days with a 10-hour eating window from 10:00 AM to 08:00 PM. Patient condition summary and initial evaluation are shown in table 1.

Table 1.
Summary of Patient Characteristics and Assessment

Variable	Result
Age	58 years old
Gender	Male
Medical diagnosis	Type 2 diabetes mellitus
Duration of diabetes	10 years
Body mass index	26.17 kg/m ²
Pre-intervention fasting blood glucose	145 mg/dL
Medication history	Metformin 500 mg three times daily and Gliclazide 80 mg once daily
Medical history	Hypertension, heart disease, and glaucoma surgery in 2018
Main complaints	Increased thirst and frequent urination
Nursing diagnosis	Blood Glucose Instability (D.0027)
TRE eating window	10 hours/day, from 10:00 AM to 08:00 PM
Duration of intervention	3 days

Nursing Implementation

During the 3-day intervention, nursing implementation focused on patient education, scheduled blood glucose monitoring, reminders to adhere to the TRE eating window, monitoring for possible hypoglycemia, and daily documentation of blood glucose values. The patient and family were also reminded to monitor for symptoms such as weakness, trembling, cold sweats, dizziness, and palpitations. Nursing care implementation is shown in Table 2.

Table 2. Nursing implementation

Day	Nursing Implementation
Day 1	Explained the purpose, procedure, benefits, and safety aspects of TRE; educated the patient and family about signs and management of hypoglycemia; measured scheduled blood glucose levels; reminded the patient to follow the eating window; and documented the results.
Day 2	Measured and evaluated blood glucose levels; reinforced adherence to the TRE schedule; reminded the patient and family about signs and management of hypoglycemia; provided brief education on blood glucose control; and documented the results.
Day 3	Measured and evaluated blood glucose levels; reinforced adherence to the TRE schedule; monitored possible hypoglycemia symptoms; provided brief education on blood glucose control; and documented the results.

Blood Glucose Monitoring Results

Blood glucose levels were monitored for 3 days during TRE implementation. The pre-intervention fasting blood glucose level was 145 mg/dL, and daily monitoring during the intervention showed lower fasting and postprandial glucose levels. No signs or symptoms of hypoglycemia were reported during the intervention period. Glucose levels during the Time-Restricted Eating intervention are shown in table 3.

Table 3.
Blood Glucose Levels During Time-Restricted Eating Intervention

Intervention Day	Fasting Blood Glucose at 07:00 AM (mg/dL)	2-Hour Postprandial Glucose after Lunch (mg/dL)	2-Hour Postprandial Glucose after Dinner (mg/dL)	Bedtime Glucose at 10:00 PM (mg/dL)
Day 1	103	130	142	115
Day 2	97	125	134	106
Day 3	83	121	123	95

Blood glucose monitoring results showed that fasting blood glucose decreased from 103 mg/dL on Day 1 to 83 mg/dL on Day 3. The 2-hour postprandial glucose after lunch decreased from 130 mg/dL on Day 1 to 121 mg/dL on Day 3, while the 2-hour postprandial glucose after dinner decreased from 142 mg/dL on Day 1 to 123 mg/dL on Day 3. Bedtime glucose also decreased from 115 mg/dL on Day 1 to 95 mg/dL on Day 3. Throughout the 3-day TRE implementation, the patient's general condition remained stable, and no symptoms suggestive of hypoglycemia were reported.

DISCUSSION

This case report described short-term changes in blood glucose levels during the implementation of Time-Restricted Eating (TRE) in a patient with type 2 diabetes mellitus. During the 3-day intervention, fasting blood glucose decreased from 103 mg/dL on Day 1 to 83 mg/dL on Day 3, 2-hour postprandial glucose after lunch decreased from 130 mg/dL to 121 mg/dL, 2-hour postprandial glucose after dinner decreased from 142 mg/dL to 123 mg/dL, and bedtime glucose decreased from 115 mg/dL to 95 mg/dL. These findings indicate a short-term downward trend in blood glucose levels during the observation period. However, they should not be interpreted as evidence of a causal effect because this case report involved only one patient and the intervention was conducted for a short period.

The findings of this case report are consistent with previous studies reporting that TRE may support glycemic regulation in individuals with type 2 diabetes. TRE was associated with changes in blood glucose levels and potential metabolic benefits (Fu et al., 2025). Other studies also showed that TRE may contribute to reductions in postprandial and evening glucose levels. In addition (Bravo-garcia et al., 2025). TRE may improve several cardiometabolic parameters, including body weight and blood glucose levels (Queiroz et al., 2023). Nevertheless, the results of this case report cannot be directly compared with clinical trials or studies involving larger samples, longer intervention periods, and more controlled dietary or physical activity protocols.

The possible decrease in blood glucose levels during TRE may be related to several mechanisms. Limiting the eating window can help regulate meal timing, reduce late-night food intake, and support more structured daily eating patterns. Previous studies have suggested that TRE may improve glucose homeostasis, insulin sensitivity, and metabolic regulation (Fu et al., 2025). In this case, the patient followed a 10-hour eating window from 10:00 AM to 08:00 PM, which may have contributed to more consistent meal timing and reduced glucose fluctuations during the observation period. However, because calorie intake was not strictly restricted and food composition was not controlled, the observed glucose changes may also have been influenced by daily food intake, physical activity, and medication use.

Safety is an important consideration when implementing TRE in patients with type 2 diabetes. In this case report, the patient continued taking oral antidiabetic medications, including Metformin 500 mg three times daily and Gliclazide 80 mg once daily. Gliclazide use requires particular attention because sulfonylurea therapy may increase the risk of hypoglycemia, especially when meal timing is altered. During the 3-day TRE intervention, the patient's general condition remained stable, and no symptoms suggestive of hypoglycemia, such as weakness, trembling, cold sweats, dizziness, or palpitations, were reported. This finding suggests that short-term TRE was tolerated in this case, but careful monitoring remains necessary before applying this intervention more broadly.

From a nursing perspective, implementing TRE requires structured education and close monitoring. Nurses play an important role in explaining the TRE schedule, ensuring the patient understands the eating and fasting periods, monitoring blood glucose levels, identifying signs and symptoms of hypoglycemia, reinforcing adherence, and documenting the patient's clinical response. Family involvement is also important because family members can help remind the patient to follow the eating window and recognize early signs of hypoglycemia. Therefore, TRE should not be applied merely as a dietary instruction but as a monitored nursing intervention that includes education, safety observation, and individualized evaluation.

Several confounding factors may have influenced the changes in blood glucose levels in this case report. The patient continued taking oral antidiabetic medication throughout the intervention, and the regimen was not modified. Food intake and physical activity were monitored but not strictly controlled. Therefore, the observed reduction in blood glucose levels cannot be attributed solely to

TRE. In addition, the 3-day intervention period was too short to assess long-term glycemic control, and blood glucose was measured with a conventional glucometer without HbA1c testing or continuous glucose monitoring. These limitations indicate that the findings should be interpreted with caution and used only as an initial clinical description of TRE implementation in a single patient with type 2 diabetes.

CONCLUSION

Implementing Time-Restricted Eating (TRE) for 3 days with a 10-hour eating window showed a short-term decline in blood glucose levels in a patient with type 2 diabetes mellitus. No symptoms suggestive of hypoglycemia were reported during the intervention, and the patient's general condition remained stable. TRE may be considered a complementary nursing strategy to support daily blood glucose regulation when accompanied by patient education, family involvement, scheduled glucose monitoring, and safety observation. However, the findings of this case report should be interpreted with caution because they were obtained from a single patient, the intervention period was short, antidiabetic medication was continued, and food intake and physical activity were not strictly controlled.

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