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CASE REPORT

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Personalized glycemic management using diabetes-specific nutrition formula combined with continuous glucose monitoring for people with diabetes in an ambulatory setting: a clinical case series

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Abstract

Introduction: Diabetes mellitus (DM) is a growing global health issue, with significant prevalence in low- and middle-income countries. Effective glycemic control is crucial to managing DM and preventing complications. **Objective:** This clinical case series evaluated the impact of diabetes-specific nutrition formulas (DSNFs) combined with continuous glucose monitoring (CGM) on glycemic control in a real-world setting of participants with DM. **Methods:** The Fine Adjustment Intervention Required (FAIR) program included adult participants (n=6) with type 1 or type 2 DM and poor glycemic control. Participants underwent a 2-week diagnostic period using CGM followed by a 4-week individualized intervention using DSNF. The intervention aimed to reduce hyper- and hypoglycemic events, improve time in range (TIR), and enhance patient-reported quality of life. Dietary modification, physical activity recommendations, and DSNF incorporation were individualized to each patient's needs. **Results:** All participants showed significant improvements in glycemic control. Clinically significant increases in TIR (>5%) was seen in 5 out of 6 participants and average change was 17 percent after the 4-week intervention. Severe hypoglycemic events were reduced in participants with hypoglycemia at baseline. Additionally, participants anecdotally reported better quality of life after participation in the FAIR program. **Conclusion**: The FAIR program demonstrated that individualized use of DSNFs and CGM can significantly improve glycemic control in participants with DM. This approach supports the importance of personalized nutrition therapy for improved glycemic management. Future research with larger sample sizes and longer follow-up periods is recommended to confirm these findings and assess long-term outcomes.

Keywords: Diabetes mellitus. Glycemic control. Prevention. Complications. Nutrition formulas.

Introduction

Diabetes mellitus (DM) is well-recognized as a growing health problem affecting 537 million people worldwide, estimated to grow to 1.31 billion cases by 2050, and with more people diagnosed coming from low- and middle-income countries **[1]**. In the Americas, prevalence of uncontrolled type 2 DM is approximately 27% **[2]** and remains the sixth leading cause of death and second leading cause of disability-adjusted life years which underscores the limiting complications that occur throughout the course of

disease **[3]**. Fortunately, DM can be managed by glycemic control, and its consequences may be avoided or delayed with a comprehensive approach that includes lifestyle changes and medical management.

In a 2023 consensus statement, The American Association of Clinical Endocrinology, highlighted 10 principles for the management of type 2 DM (T2DM) including: 1) lifestyle modification underlies all therapy; 2) maintain or achieve optimal weight; 3) choice of antihyperglycemic therapy reflects glycemic targets; 4) choice of therapy includes ease of use and access; 5) optimal A1C is < or equal 6.5% or as close to normal as is safe and achievable for most participants; 6) individualize all glycemic targets; 7) get to goal as soon as possible; 8) avoid hypoglycemia; 9) continuous glucose monitoring is highly recommended to assist participants in reaching goals safely; and, 10) comorbidities must be managed for comprehensive care **[4]**. Diabetes self-management education and support (DSMES) by the multidisciplinary team, which includes self-monitoring blood glucose (i.e., capillary finger-prick or continuous glucose monitoring (CGM) and medical nutrition therapy (MNT), is recommended to influence behavior change and glycemia for people with DM **[5-7]**.

While finger-prick testing has been long utilized for those with diabetes, evidence on benefits of real-time CGM or 14-day flash glucose monitoring in people with diabetes treated with insulin is growing **[8,9]**. Previous trials such as IMPACT and MOBILE have shown 14-day flash glucose monitoring to be effective in type 1 and type 2 diabetes, respectively **[10,11]**. Additionally, MNT used in combination with self-monitoring can be an effective strategy for management and an individualized, dynamic approach may be necessary to promote adherence. MNT can include dietary adjustments through diet education and oral nutrition supplements to promote adherence and support improvements in healthful eating patterns and glycemia. MNT is typically performed by registered dietitians and associated with 0.3-2% improvement in hemoglobin A1C for people with DM **[6,7]**.

Achieving glycemic goals through MNT should be completed as soon as possible (within 3 months) to reduce diabetes-related complications. Therefore, additional healthcare providers, such as endocrinologists, may be responsible for providing timely MNT in conjunction and/or when access to registered dietitians is limited or unavailable. Therefore, there is a gap in individualized education for those with poorly controlled DM (according to the American Diabetes Association (ADA), poorly controlled diabetes, or hyperglycemia, is indicated by blood glucose levels persistently above 140 mg/dL (7.8 mmol/L) and an A1C level of 6.5% or higher) and a need for rapid interventions to help people get to glycemic goals within a short intervention period.

Diabetes-specific nutrition formulas (DSNFs) are a key strategy that MNT clinicians may use as DSNFs have a defined nutrient composition which includes low-glycemic, modified carbohydrates, dietary fiber, mono- and/or poly-unsaturated fatty acids, proteins, vitamins, and minerals to enable better glycemic control. Use of DSNFs may be a convenient, simple strategy for healthcare providers and people with DM as they can be used as 1) iso- or hypocaloric meal or snack replacements for glycemic and weight management, 2) hypercaloric supplementation for people with malnutrition, or 3) enteral nutrition support. While current literature has demonstrated effectiveness of DSNFs on management of glycemia, blood lipids and body weight in randomized control trials of various settings **[12-14]**, limited evidence exists that describes the real-world application of MNT using an individualized approach for DSNFs in conjunction with CGM. To evaluate the role of DSNF on individual glycemic response in a real-world setting, we aim to describe the clinical experiences of people with DM who participated in the Fine Adjustment Intervention Required (FAIR) program.

The FAIR program objectives utilized DSNF and CGM as part of an individualized treatment plan to 1) reduce or eradicate moderate and/or severe hyper and hypoglycemia events; 2) improve the percentage of glycemic time in range according to individual goals objective; 3) improve the quality of life of participants according to individual expectations; 4) educate the patient in the management of their diabetes, knowing their own responses to treatments and their modifications; and 5) prevent the negative impact of those events or changes in habits (triggers) that impact good diabetes control.

Methods

Study Design and Settings

This study followed the CARE – Case Report Guideline. Available at: https://www.care-statement.org/checklist. Accessed on: May 15, 2026.

The FAIR program (Figure 1) clinical experiences were described for adult participants who sought care from an endocrinologist in Latin America with 1) a history of type 1 or type 2 DM for >5 years; 2) irregular glycemic control defined as percent time in range (TIR) <70% and/or episodes of moderate to severe hypoglycemia; 3) hypoglycemic medications and/or insulin; and 4) willingness to seek better control of the disease. The endocrinologist chose participants

for the FAIR program based on these inclusion parameters and capacity to improve glycemia through the inclusion to the structured intervention.

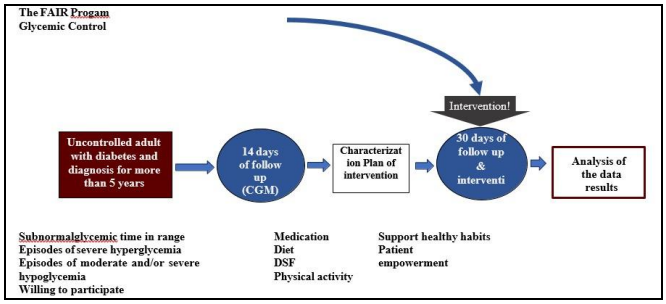

Figure 1. Components of the Fine Adjustment Intervention Required (FAIR) program of people with diabetes who utilized continuous glucose monitoring (CGM) and diabetes-specific formula (DSNF) for glycemic control. Program clinical objectives include: 1) reduce or eradicate hypo-and/or hyperglycemic events; 2) improve the percent glycemic time in range according to individual goals; 3) improve the quality of life of participants according to individual expectations; 4) educate the patient in the management of their diabetes, knowing their own responses to treatments and their modifications; and 5) prevent the negative impact of those events or changes in habits (triggers) that impact good diabetes control. Source: Own authorship.

Ethical Approval

This study was approved in accordance with the provisions of the Declaration of Helsinki, as updated in 2024. Informed consent was obtained from participants in accordance with the principles outlined in the Declaration of Helsinki and relevant institutional regulations.

Participants and Analysis

Participants wore a CGM (Freestyle Libre®; Diabetes Care Division of Abbott) for 6 weeks, which included a 2-week diagnostic period followed by a 4-week individualized intervention. Glucose management was supported by finger-prick testing (as needed) through the strip port of the CGM reader. Participants were asked to maintain their usual diet, medication, and behaviors in the diagnostic period, and CGM data were analyzed afterwards to characterize trends in TIR, episodes of hyper- and hypoglycemia, and glycemic variability. Assessments were conducted to examine usual dietary intake (including food preferences), nutritional status, alcohol and tobacco use, work routines and schedules, physical activity, medical and medication history, and other concerns regarding glycemic control during this period.

Using diagnostic period data, an individualized plan that included adjustments to diet, medications, and/or physical activity recommendations was designed by the treating endocrinologist according to their glycemic management needs for each person to follow for 4-weeks. Instead of a standard recommendation, incorporation of an oral DSNF (Glucerna®; Nutrition Division of Abbott) was recommended at least once daily, in which timing was tailored to the number and severity of hyper- and/or hypoglycemic episodes and percent of time out of range. Prescribed diet recommendations were either hypo-, iso-, or hypercaloric and promoted changes to meal distributions and diet quality based on the patient's individual nutritional needs. Participants were in contact with their endocrinologist weekly to analyze results in real time and adjust the treatment plan as appropriately. All clinical management decisions were made independently by the treating endocrinologist, as well as modifications to medications, changes in diet, and any other recommendations during the clinical experience. At the end of the experience, endocrinologists reported the cases in a de-identified report to record demographics, measures of glycemia, acceptance by participants and caregivers, intervention modifications, and impact on the achievement of individual glycemia goals.

RESULTS

A total of 6 participants were included in this case series report from three different endocrinologist from Latin America. Demographic data are presented in Table 1. Ages ranged between 44-74 years old, and half (50%) of the participants were male. Majority (67%) of participants were diagnosed with T2D and considered either overweight or with obesity.

Table 1. Demographics of participants with diabetes who participated in the FAIR program.

Case	Gender	Age (years)	Type	Disease Duration (years)	Height (cm)	Weight (kg)	BMI (kg/m²)	WC (cm)	Random Glycemia (mg/dL)	Comorbidities	Medications
N1	Female	45	T2DM	12	157	95.7	38.7	122	191	Glucose intolerance, dyslipidemia, hypothyroidism	sitagliptine/metformin 50/1000 mg BID; irbesartan 150 mg; gliclazide 60 mg/d; Gemfibrozil 600 mg/d; levothyroxine 0.1 mg/d; gabapentin 600 mg
N2	Female	44	T2DM	-12	159.0	78.7	31.1	108	207	diabetic neuropathy, dyslipidemia, HTN	lovastatin 20 mg/d; dapagliflozin/ metformin XR; insulin 48/24-0-28/18; venlafaxine 150 mg/d; pregabalin 150 mg/d
N3	Female	56	T1DM	12	164.0	70	28.4	90	134	Hypothyroidism, HTN, arthritis rheumatoid	NPH insulin 18-18-18-20; levothyroxine 200 ug/d-M-F 100 ug S-S; methotrexate 6 doses/week; folic acid 5 mg; sulfasalazine 2 tab TID; hydroxychloroquine 1 tab/d
N4	Male	74	T2DM	10	180.0	78.5	24.3	98	148	HTN; dyslipidemia; diabetic neuropathy	gliclazide MR 60mg 2 cap/d; semaglutide 7 mg oral 1 cap/d; losartan 50mg 2x/d: atenolol 25mg 2x/d: rosuvastatin 20mg/d; ezetimibe 10 mg/d; cholecalciferol 2000 IU/d
N5	Male	58	T1DM	6	177.0	90.5	28.9	85	95	dyslipidemia	basal insulin 18 IU/d; insulin aspart 12 Sensitivity 40 Bolo
N6	Male	63	T2DM	27	170.0	78.5	27	132	157	HTN; dyslipidemia	basal insulin 38 IU/d; fixed 4: liraglutide 1.8 mg; Metformin 2 g; Empagliflozin 25 mg/d; Atorvastatin 40 mg/d; Losartan 100 mg/d, Derrumal 300 mg/d

Abbreviations: T1DM, type 1 diabetes mellitus; T2D, type 2 diabetes mellitus; iSGLT2, sodium/glucose cotransporter 2 inhibitor; HTN, hypertension. Source: Own authorship.

Patient's glycemia metrics before and after the intervention are listed in Table 2 and Figure 2. The 14-day follow-up period before the intervention allowed us to characterize the behavior of glucose individually, according to each person's routines, medications, diet, and habits. Among the cases reported with lack of glucose control, we found participants presented with varying degrees of hypo- and/or hyperglycemia, and low glycemic TIR. Some participants included in the intervention additionally reported changes to their routines such as increases in physical activity, new behaviors to avoid hypoglycemic complications, or loss of their usual health care provider. Using this information, the patient's commitment to be involved in all the changes was achieved with full understanding and ongoing communication with the endocrinologist. A structured approach was designed that considered diet, medications, and physical activity. DSNF was used to introduce rapid changes according to CGM reports and individual goals by replacing as a meal or snack, or as part of the overall diet.

Table 2. Continuous glucose monitoring metrics before and after the intervention.

CASES		Mean Glucose (mg/dL)	Hemoglobin A1C (%)[a]	Glycemic variability (%CV)	Severe high (%)[b]	High (%)[c]	Time in range (%)[d]	Low (%)[e]	Very low (%)[f]
N1	Before	176	7.5	27.8	9	29	62	0	0
	After	138	6.6	28.9	1	15	84	0	0
	Change	-38	-0.9	1.1	-8	-14	22	0	0
N2	Before	118	6.1	42.1	2	7	79	9	3
	After	128	6.4	30.7	1	9	87	3	0
	Change	10	0.3	-11.4	-1	2	8	-6	-3
N3	Before	150	7.0	42.6	14	17	47	11	11
	After	168	7.4	38.6	26	13	46	9	8
	Change	18	0.4	-4.0	9	-4	-1	-2	-3
N4	Before	180	7.3	29.5	5	32	61	2	0
	After	145	6.7	28.3	1	15	83	1	0
	Change	-25	-0.6	-1.2	-4	-17	22	-1	0
N5	Before	178	7.8	30.3	16	33	51	0	0
	After	160	6.9	27.5	1	19	79	1	0
	Change	-40	-0.9	-2.8	-15	-14	28	1	0
N6	Before	181	7.6	42.2	18	34	39	7	2
	After	145	6.8	40.3	5	24	62	8	1
	Change	-36	-0.8	-1.9	-13	-10	23	1	-1

[a] Estimated using the glucose management indicator (GMI).[b] Defined as blood glucose >250 mg/dL. [c] Defined as blood glucose >180 mg/dL. [d] Defined as blood glucose 70-180 mg/dL. [e] Defined as blood glucose <70 mg/dL. [f] Defined as blood glucose <54 mg/dL. Source: Own authorship.

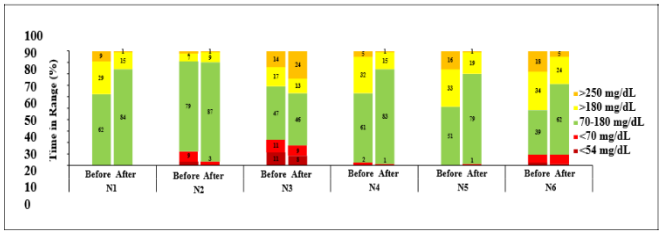

Figure 2. Comparison of glycemic time in range (TIR) before and after the intervention. TIR values before the intervention represent data from the 2-week diagnostic period and values after represent data after 4 -weeks of intervention. Source: Own authorship.

- **Case N1:** 45-year-old woman with obesity and T2DM for 12 years. Baseline measurements showed moderate to severe hyperglycemia of 38%, a calculated hemoglobin A1C of 7.5%, a glycemia TIR of 62%, and no hypoglycemia. CGM data of the 14 days prior to the intervention showed early morning hyperglycemia due to the dawn phenomenon. A diet with moderate caloric restriction of 1900 kcal/day was designed, physical activity was recommended, and dinner was replaced with a DSNF. At follow up, average blood glucose, episodes of severe and moderate hyperglycemia, and calculated A1C decreased, and TIR increased significantly by 22 %.
- **Case N2:** 44-year-old, woman with obesity and T2DM for 12 years and diabetic peripheral neuropathy. Baseline measurements showed moderate to severe hyperglycemia and hypoglycemia. A diet with moderate calorie restriction of 1,900 kcal/d was designed, physical activity was recommended, and dinner was replaced with DSNF. At follow up, average blood glucose and severe episodes of hypo- and hyperglycemia decreased, as well as an 8% increase in TIR. She reported severe hypoglycemic episodes overcame improving her quality of life
- **Case N3:** 47-year-old woman with T2DM for 12 years. Baseline measurements showed moderate to severe hyperglycemia, low glycemic TIR, significant moderate and severe hypoglycemia. Patient reported compromised quality of life due to nocturnal episodes of hypoglycemia. With a treatment focused on decreasing hypoglycemic episodes, dinner was replaced with DSNF in the evenings. At follow up, while her hyperglycemia did increase slightly, time spent in moderate and severe hypoglycemia significantly decreased. It is common for participants with severe hypoglycemia to modify diet and medications to avoid risks but worsen glycemic control and this specific patient will need further interventions to improve glycemic control.
- **Case N4:** 74-year-old man, with T2DM for 10 years, diabetic neuropathy, imbalance. CGM data of the 14 days prior to the intervention showed episodes of significant hyperglycemia, and a reported fear of hypoglycemia during exercise, which lead her to drink fruit juices. Patient reported goals were to gain more muscle mass and limit hypoglycemia during exercise. DSNF was replaced with fruit juices before exercises which led to improvements in severe hyperglycemia and hypoglycemia. Subsequently, hemoglobin A1c decreased by 0.6% and TIR increased by 22% after the individualized intervention.
- **Case N5:** 42-year-old man, with T1DM for 6 years. CGM baseline data 14 days prior to the intervention

showed significant moderate to severe hyperglycemia during the afternoon, a low TIR (<70%), and no hypoglycemia. A healthy dietary pattern was designed according with his work schedule, and a DSNF was introduced as a snack in the afternoon. At follow up, moderate and severe hyperglycemia decrease which led to a 28% increase in TIR. Additionally, one episode of moderate hypoglycemia was indicated.

- **Case N6:** 63-year-old man, recently widowed, with T2DM for 15 years. CGM baseline data 14 days prior to the intervention showed significant moderate and severe hyperglycemia, low TIR (<70%), moderate and severe hypoglycemia. DSNF was incorporated as a meal replacement at breakfast which led to severe hyperglycemia decreased, hemoglobin A1c and TIR increased by 0.9 and 23 percent (respectively), and severe hypoglycemia decreased.

Discussion

These case reports of clinical experiences were comprised specifically of participants diagnosed with type 1 or 2 DM for more than 5 years, who presented a lack of control of the disease despite the modifications made by the endocrinologist in recent months. Participants with DM who underwent an individualized intervention using CGM and incorporation of daily DSNF were able to achieve improved glycemic control including clinically significant increases in TIR (5 out of 6 participants) and decreased hypoglycemic events (4 out of 6 participants). Average change seen in these clinical experiences for glycemic TIR was 17 percent. Previous studies have demonstrated every 5% increase in TIR is considered clinically significant **[15]** and every 10% change in TIR is associated with a 0.8% change in hemoglobin A1C **[16]**. Additionally, every 10% change in TIR is inversely associated with long term risk for retionapthy and microalbuminuria occurences **[15]**. Changes in hemoglobin A1C by at least 0.8% (as 12easured by GMI) were observed in 50% (n=3) of participants after the clinical experiences. For participants who did not achieve at least 0.8% improvement, this may be explained by improvements in moderate and/or severe hypoglycemia episodes with the intervention. It is possible longer follow up after the intervention for participants with hypoglycemia would have translated to improvements in hemoglobin A1C. Nevertheless, 83% (n=5) were able to achieve/maintain a hemoglobin A1C less than 7 percent after the intervention, which is in line with recommendations by the American Diabetes Association **[17]**.

With the aim of reaching goal TIR as soon as possible, this applies not only immediately after diagnosis, but during any circumstance that leads to a continued lack of glycemic control. Glycemic control is critical to reduce the burdens of DM, such as disease-related complications, hospitalization rates, and medical costs. For people with DM, glucose control improves functional capacity, life expentacy and the overall health related quality of life.[18,19] Poor glycemic control is seen in two-thirds of participants with DM and can occur over time due to partially or totally reducing insulin production and/or sensitivity, loss of the ability to adapt to changes in the response to carbohydrate intake, or to an in adequate response to new metabolic conditions caused or not by disease. Usually, the only intervention that people receive are increases and/or modifications in medications, which often cause adverse events if not individually adapted to the specific variability of blood glucose response which is impacted by a variety of factors (e.g., diet, physical activity, work routines, actions of caregivers, fears of how they are managed, new medications, comorbidities and the level of self-care and education). Therefore, individualized management of the patient given that each person with diabetes has a different disease burden, different lifestyle habits, as well as their diet, physical activity, and responds differently to same foods.

Generic recommendations are only a starting point for management that must be modified based on the responses of treatments over time **[20]**. Tools such as CGM provide a better characterization of glucose behavior and thus help with implementation of individualized therapeutic interventions. The inclusion of DSNFs as part of a structured lifestyle intervention is an easy and convenient strategy to support reaching glycemic goals, while all other changes are implemented.

The aim of including use of DSNF can be divided into three main clinical objectives: 1) supporting control the glycemic variability out of range, 2) improve and/or maintain the nutritional status of the patient with DM who has ONS or enteral nutrition indicated, and 3) include as part of structured management for to optimized the metabolic control of participants. Each clinical objective has a different focus and specific implementation time to achieve the goals of the interventions. Consistent with previous reported literature **[12-14]**, inclusion of daily DSNF as part of the intervention led to clinically significant improvements in glycemic targets. Clinical objectives that saught to change or maintain nutritional status or metabolic management when other approaches are required were not included in the experiences, although some impact on these clinical objectives was observed in the short period of the intervention time (4 weeks).

Three participants presented with early morning hyperglycemia, one of which was identified due to dawn phenomenon. This phenomenon, defined as an increase in blood of more than 20 mg/dL that occurs at the end of the night, is caused by endogenous hormones (cortisol and growth hormone) that naturally cause an early increase in blood sugar at end of night and in the morning stimulating the liver to produce glucose. Regardless of the type of diabetes, approximately half of people with diabetes experience this event **[21]**. Two main events cause morning highs: the dawn phenomenon and insulin depletion (low insulin at night leading to a subsequent increase in blood glucose) **[22]**. A third, much rarer cause, known as the Somogyi effect (significant hypoglycemia at night followed by a compensatory increase in blood glucose), may also be responsible. Consistent measures were taken to manage this with nighttime glycemic control, medication, last meal, or with measures to prevent a true dawn phenomenon **[23]**. DSNF was included in the evening as a meal replacement or bedtime snack which led to improvements in TIR after follow up.

Additionally, all participants with hypoglycemia included in the clinical experiences significantly reduced prevalence of severe hypoglycemia (defined as blood glucose <54 mg/dL). Hypoglycemia is potentially one of the most serious acute adverse effects of therapies for diabetes. Clinically when blood glucose falls less than 70 mg/dL, immediate action is required. However, this cut off can vary depending on the individual blood glucose target. Its posited hypoglycemic events are more frequent than reported and half of all events occur during sleep **[21]**.

The incidence range in T1DM is between 0.62 to 3.2 events/person/year **[24]**. While for T2DM, the incidence of severe hypoglycemia is approximately 80 events/100-person/year **[25]**. This may be due to a physiologic disruption in I with DM in which low plasma glucose does not suppress beta-cell insulin secretion, so the signal to increase pancreatic alpha-cell glucagon secretion during hypoglycemia is absent **[26]**. Additionally, the release of catecholamines is diminished. Hypoglycemia is associated with adverse events such as cardiac arrhythmias, sudden death and ischemic cerebral damage **[27-31]**. The risk factors of hypoglycemia are categorized as clinical (increased insulin sensitivity), medication-related (insulin) and lifestyle factors (delayed or missed meals, exercise, alcohol consumption among others). It is common for participants with severe hypoglycemia to modify diet and medications to avoid risks but worsen glycemic control.

Final Considerations and Limitations

A stenghth of this study is demonstrating real-world application of individualized incorporation of DSNF guided by CGM. This allowed clinicans to determine the most effective timing of DSNF to improve patient glycemic parameters and get to goal as soon as possible. There are limitations that should be noted with these clinical experiences. Four weeks for an intervention may be too short to improve clinical outcomes such as hemoglobin A1C and other glycemic targets. However, there were clinically significant changes observed for TIR and those diagnosed with severe hypoglycemia showed an improvement (i.e., fewer episodes of severe hyperglycemia and/or an increase in glucose time in range). Participants reported a triggering cause for the lack of glucose control in these participants, such as the start of exercise, fear of hypoglycemic episodes (especially at night), the change in work schedule (from day to night) or the management of periods of work time with high stress and without any income, and finally, losing the person who served as caregiver.

Conclusion

The use of an individualized program with DSNFs in combination with CGM can significantly improve glycemic control in people with DM. This personalized approach enhances TIR and reduces glycemic events, supporting better overall diabetes management. These clinical cases highlight DSNFs as an effective part of MNT in a real-world setting. Future research should explore larger and longer trials to confirm these benefits and assess longterm outcomes. Occupy a discrete place in the nutritional armamentarium for the management of diabetes, however these clinical cases demonstrated that DSNFs could be part of glycemic control in diabetes participants.

CrediT

Author contributions: Conceptualization and Methodology: PR, JL; Investigation: LD, DR, RJPW; Resources: PR; Data Curation: PR, JL; Writing – Original Draft: CR and PR; Writing – Review & Editing: LD, DR, RJPW; Visualization: CR; Funding Acquisition: PR.

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Ethical Approval

This study was approved in accordance with the provisions of the Declaration of Helsinki, as updated in

2024. Informed consent was obtained from participants in accordance with the principles outlined in the Declaration of Helsinki and relevant institutional regulations.

Informed Consent

It was applicable.

Funding

Funding for this study was provided by Abbott.

Data Sharing Statement

The raw data supporting the conclusions of this article will be made available by the authors and Abbott Laboratories on request. This study followed the CARE – Case Report Guideline. Available at: https://www.carestatement.org/checklist. Accessed on: May 15, 2026.

Publication Statement

All authors have agreed to the publication of this article.

Conflict of Interest

CR, PR, and JL are employees and stockholders of the Nutrition Division of Abbott. All other authors report no relevant disclosures. The other authors declare no conflicts of interest.

Similarity Check

It was applied by Ithenticate@.

Application of Artificial Intelligence (AI)

Not applicable.

Peer Review Process

It was performed.

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