

## Effect of Classical Yoga Sutra 1.14-Based Lifestyle Intervention on Glycemic Control in Type-2 Diabetes: A Case Series

Dr. Ram Kishore <sup>1</sup>, Dr. Praveen Katiyar <sup>2</sup>, Dr. Ashish Kumar Katiyar <sup>3</sup>, Dr. Anurag Mishra <sup>4</sup>, Dr. Sonu Kumar <sup>5</sup>, Anil Kumar Yadav <sup>6\*</sup>

<sup>1</sup>Assistant Professor, Department of Yoga, Chhatrapati Shahu Ji Maharaj University, Kanpur, U.P, India, 208024  
Email: ramkishoreg7@gmail.com | Mobile: 9451409112  
ORCID: <https://orcid.org/0009-0003-6985-5453>

<sup>2</sup>Associate Professor, School of Health Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India, 208024  
Email: drpraveenkatiyar@gmail.com  
ORCID: 0000-0001-5902-8073

<sup>3</sup>Assistant Professor, Department of Physical Education and Sports, Chhatrapati Shahu Ji Maharaj University, Kanpur, U.P., India  
Email: akaty@csjmu.ac.in | Mobile: 9935277478  
ORCID: <https://orcid.org/0000-0003-0442-1702>  
Scopus Author ID: 57202905483

<sup>4</sup>School of Health Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India, 208024  
Email: mishra.anurag1989@gmail.com  
ORCID: 0009-0005-8739-5483

<sup>5</sup>Assistant Professor in Physical Education, Dept. of Education (Physical Education), Lovely Professional University, Punjab, India  
Email: sonulnupe10@gmail.com

<sup>6\*</sup>Ph.D Scholar, Department of Yoga, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India, 208024  
Email: anilyadav10071985@gmail.com  
ORCID: <https://orcid.org/0009-0008-4104-7557>

**\*Corresponding Author:** Anil Kumar Yadav, Ph.D Scholar, Department of Yoga, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India, 208024. Email: anilyadav10071985@gmail.com

### Abstract

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder primarily associated with sedentary lifestyle, improper dietary habits, stress, and insulin resistance. Lifestyle modification is considered a cornerstone in the management of T2DM. Yoga, as a holistic mind–body discipline, has shown promising effects in improving glycemic control and overall well-being. This case study reports a 48-year-old male diagnosed with T2DM for one year who underwent a structured yogic lifestyle intervention for approximately seven months. The intervention included specific yogāsanas, prāṇāyāma practices, meditation focusing on the Manipura Chakra, and a disciplined yogic dietary regimen. Significant improvements were observed in fasting blood glucose, post-prandial blood glucose, HbA1c levels, body weight, stress management, sleep quality, and overall energy levels. The patient was also able to reduce his antidiabetic medication under medical supervision. This case suggests that a well-designed yogic lifestyle intervention may play a substantial role in achieving glycemic remission in patients with Type 2 Diabetes Mellitus. However, larger controlled clinical studies are required to substantiate these findings.

**Keywords:** Type 2 Diabetes Mellitus, Yoga Therapy, Yogic Lifestyle, Pranayama, HbA1c, Case Study

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**Introduction**

Type 2 Diabetes Mellitus is a rapidly growing public health challenge worldwide, characterized by chronic hyperglycemia due to insulin resistance and relative insulin deficiency. Conventional management primarily includes pharmacotherapy along with dietary regulation and physical activity. However, long-term dependence on medication often fails to address the underlying lifestyle and psychosomatic contributors such as stress, irregular routine, and reduced physical activity.

Yoga is an ancient Indian science that emphasizes the integration of body, breath, mind, and lifestyle discipline. Classical yogic texts describe health as a state of balance between physiological, psychological, and metabolic processes. Contemporary research indicates that yogic practices may enhance insulin sensitivity, reduce stress-induced hormonal imbalance, improve autonomic regulation, and promote metabolic homeostasis. The present case study aims to document the reversal of glycemic parameters in a patient with Type 2 Diabetes Mellitus following a structured yogic lifestyle intervention.

**Case Presentation**

**Patient-1**

*Patient Information*

A 48-year-old male patient diagnosed with Type 2 Diabetes Mellitus one year prior to the intervention was enrolled in this yogic lifestyle program. The patient had no family history of diabetes and reported an active lifestyle related to his professional occupation, although it involved prolonged sitting hours.

- **Age:** 48 years
- **Gender:** Male
- **Duration of Diabetes:** 1 year
- **Type:** Type 2 Diabetes Mellitus
- **Family History:** Absent
- **Lifestyle:** Moderately active with prolonged sitting during work

**Baseline Clinical Assessment (01 April 2025)**

At baseline, the patient presented with poor glycemic control despite regular intake of oral hypoglycemic agents.

Parameter	Value
Fasting Blood Sugar (mg/dl)	162.39
Post-Prandial Blood Sugar (mg/dl)	216.6
HbA1c (%)	8.3
Body Weight (kg)	70.5
Medications	Sitalent-M (SR) – once daily, Glycomet-500 (SR) – once daily, Avas-10

**Patient-2**

**Patient Information**

A 52-year-old male patient with a five-year history of Type 2 Diabetes Mellitus and a sedentary occupational lifestyle was enrolled in the yogic lifestyle intervention program. The patient reported no family history of diabetes and was not on any pharmacological treatment at baseline.

- **Age:** 52 years
- **Gender:** Male
- **Duration of Diabetes:** 5 years
- **Type:** Type 2 Diabetes Mellitus
- **Family History:** Absent
- **Lifestyle:** Sedentary

**Baseline Clinical Assessment (21 July 2024)**

The patient exhibited severe hyperglycemia at baseline with markedly elevated HbA1c levels.

Parameter	Value
Fasting Blood Sugar (mg/dl)	233
Post-Prandial Blood Sugar (mg/dl)	353
HbA1c (%)	13.9
Body Weight (kg)	51
Medications	None

**Patient-3**

*Patient Information*

A 46-year-old male patient with a five-year history of Type 2 Diabetes Mellitus and an otherwise active lifestyle was enrolled in the yogic lifestyle intervention program. The patient had no family history of diabetes and was receiving pharmacological treatment for blood sugar, blood pressure, and cholesterol at baseline.

- **Age:** 46 years
- **Gender:** Male
- **Duration of Diabetes:** 5 years
- **Type:** Type 2 Diabetes Mellitus
- **Family History:** Absent
- **Lifestyle:** Active

**Baseline Clinical Assessment (01 June 2025)**

At baseline, the patient presented with moderately elevated glycemic parameters and excess body weight.

Parameter	Value
Fasting Blood Sugar (mg/dl)	150
Post-Prandial Blood Sugar (mg/dl)	220
HbA1c (%)	7.2
Body Weight (kg)	79
Medications	Antidiabetic medication, antihypertensive medication, lipid-lowering medication

—|—| | Fasting Blood Sugar (mg/dl) | Not Available | | Post-Prandial Blood Sugar (mg/dl) | Not Available | | HbA1c (%) | 7.2 | | Body Weight (kg) | 79 | |

Medications | Antidiabetic medication, antihypertensive medication, lipid-lowering medication |  
 ———|———| | Fasting Blood Sugar (mg/dl) | 233 | |  
 Post-Prandial Blood Sugar (mg/dl) | 353 | | HbA1c (%) |  
 13.9 | | Body Weight (kg) | 51 | | Medications | None |

Baseline Clinical Assessment (01 April 2025)

At baseline, the patient presented with poor glycemic control despite regular intake of oral hypoglycemic agents.

Parameter	Value
Fasting Blood Sugar (mg/dl)	162.39
Post-Prandial Blood Sugar (mg/dl)	216.6
HbA1c (%)	8.3
Body Weight (kg)	70.5
Medications	Sitalent-M (SR) – once daily, Glycomet-500 (SR) – once daily, Avas-10

Yogic Lifestyle Intervention

The patient underwent a comprehensive yogic lifestyle intervention under the guidance of a qualified yoga expert. The program was practiced regularly, seven days a week.

**Yogāsana Practices**

- 51 rounds of Sūrya Namaskāra
- Bhujangāsana
- Dhanurāsana
- Mandūkāsana
- Vakrāsana

**Prāṇāyāma and Yogic Kriyās**

- Kapālabhāti
- Uḍḍīyāna Bandha
- Udara Śakti Vikāsa Kriyā
- Anuloma–Viloma
- Bhastrikā
- Sūryabhedī
- Bhrāmarī

**Meditation Practice**

Meditation was performed on the **Manipura Chakra**, visualizing the rising sun while chanting the “**Ram (ॠ)**”

**Bīja Mantra**, aiming to enhance metabolic fire (Agni) and psycho-physiological balance.

**Yogic Diet Principles**

1. Consumption of seasonal fruits only until 12:00 noon.
2. At lunch, intake of raw salad or fruits equivalent to approximately 1% of body weight, followed by a balanced normal diet.
3. Light dinner, taken before 8:00 PM, slightly less than full satiety.

**Duration and Frequency and Exposure–Outcome Relationship**

- **Protocol:** Identical yogic lifestyle protocol for all three participants
- **Weekly Practice Frequency:**
  - Patient–1: 7 days per week
  - Patient–2: 5 days per week
  - Patient–3: 7 days per week
- **Total Duration of Intervention:**
  - Patient–1: 7 months
  - Patient–2: 17 months
  - Patient–3: 5 months

This case series demonstrates a clear relationship between **practice frequency, total duration of exposure, and speed of clinical outcomes**. Patients practicing yoga seven days per week achieved glycemic normalization in a shorter duration, whereas reduced weekly frequency was associated with a longer duration required to achieve comparable metabolic improvements.

**Outcome Measures and Results**

After consistent yogic lifestyle practice, significant improvements were observed in biochemical, physical, and psychological parameters.

**Post-Intervention Clinical Assessment (04 November 2025)**

Parameter	Value
Fasting Blood Sugar (mg/dl)	119
Post-Prandial Blood Sugar (mg/dl)	168
HbA1c (%)	5.5
Body Weight (kg)	65
Medication Status	Reduced (under medical supervision)

**Post-Intervention Clinical Assessment – Patient–3 (05 November 2025)**

Parameter	Value
Fasting Blood Sugar (mg/dl)	120
Post-Prandial Blood Sugar (mg/dl)	150
HbA1c (%)	5.6
Body Weight (kg)	72
Medication Status	Antidiabetic medication stopped (May 2025); BP normalized without medication

—————|—————| | Fasting Blood Sugar (mg/dl) | 119 | |  
 Post-Prandial Blood Sugar (mg/dl) | 168 | | HbA1c (%) |  
 5.5 | | Body Weight (kg) | 65 | | Medication Status |  
 Reduced (under medical supervision) |

The patient demonstrated a marked reduction in HbA1c from 8.3% to 5.5%, indicating achievement of near-normoglycemic status.

### Additional Observations

The patient reported several subjective improvements following the intervention: 1. Stress levels reduced by approximately 80–90% within five months of regular practice. 2. Significant improvement in sleep quality. 3. Sustained energy levels throughout the day, even after prolonged work hours. 4. Normal and healthy digestion with improved appetite. 5. Complete relief from chronic spinal discomfort associated with prolonged sitting. 6. Enhanced overall freshness, vitality, and sense of well-being.

### Discussion

The findings of the present case series gain deeper significance when interpreted in the light of the classical yogic principle of **abhyāsa** as described in *Patañjali Yoga Sūtra* 1.14:

“स तु दीर्घकालनैरन्तर्यसत्कारासेवितो दृढभूमिः”  
(*Sa tu dīrghakāla-nairantarya-satkārāsevitaḥ dṛḍhabhūmiḥ*)

Patañjali clearly states that practice becomes firmly grounded when it is performed **over a long period (dīrghakāla), without interruption (nairantarya), and with sincerity and reverence (satkāra)**. This sutra provides a foundational theoretical framework for understanding the outcomes observed in this clinical yoga case series.

In the present study, all three patients followed an identical yogic lifestyle protocol; however, variations were observed in the **frequency of weekly practice and total duration of intervention**. Patient-1 and Patient-3, who practiced the protocol **seven days per week**, achieved near-normoglycemic HbA1c levels within **7 months and 5 months**, respectively. In contrast, Patient-2, who practiced the same protocol only **five days per week**, required a substantially longer duration of **17 months** to attain comparable metabolic improvement.

This pattern clearly reflects the principle of *nairantarya* (regularity without break) emphasized in *Yoga Sūtra* 1.14. Although Patient-2 demonstrated significant improvement, the reduced weekly continuity of practice appears to have slowed the stabilization of metabolic outcomes. Conversely, uninterrupted daily practice in Patient-1 and Patient-3 facilitated faster physiological adaptation, improved insulin sensitivity, and more rapid glycemic normalization.

The component of *dīrghakāla* (long-term engagement) is also evident, as none of the patients achieved reversal through short-term intervention alone. Sustained exposure to *yogāsana*, *prāṇāyāma*, meditation, and disciplined dietary practices was essential for

establishing metabolic stability. Additionally, *satkāra*—practice performed with commitment, discipline, and respect—was reflected in the high adherence levels and lifestyle integration reported by the patients.

From a contemporary scientific perspective, this sutra-aligned observation may be explained through cumulative physiological effects such as enhanced muscular glucose uptake, improved autonomic balance, reduced cortisol-mediated insulin resistance, and improved neuro-endocrine regulation. Yoga thus operates not as an acute intervention but as a **progressive adaptive process**, the efficacy of which depends on consistency and duration, precisely as described in classical yogic literature.

Therefore, the present case series provides **experimental support to the classical yogic doctrine of abhyāsa**, demonstrating that the principles articulated in *Yoga Sūtra* 1.14 are not merely philosophical but have direct clinical relevance. The observed dose–response relationship between practice regularity and speed of diabetes reversal underscores the scientific validity of yogic texts and strengthens the bridge between classical yoga philosophy and modern clinical yoga research.

### Conclusion

The findings of the present case series strongly support the classical yogic principle of *Abhyāsa* as described in **Yoga Sutra 1.14 – “Sa tu dīrgha-kāla-nairantarya-satkārāsevito dṛḍhabhūmiḥ”**. Although all patients followed an identical yogic lifestyle protocol, differences in **duration (dīrgha-kāla)** and **regularity (nairantarya)** of practice resulted in varying timeframes for diabetes reversal. Patients who practiced yoga daily (7 days/week) achieved glycemic normalization in a shorter duration, whereas the patient with less frequent practice (5 days/week) required a longer intervention period to attain comparable outcomes. This clearly demonstrates that the *intensity, continuity, and sincerity* of yogic practice significantly influence therapeutic results.

**Clinical implication of Yoga Sutra 1.14 for Yoga Prescription:** Yoga therapy prescriptions for type-2 diabetes should not be limited to the selection of *asana*, *pranayama*, and diet alone, but must explicitly incorporate guidance on *long-term practice, daily regularity, and disciplined adherence*. Incorporating the principle of *Yoga Sutra* 1.14 into clinical yoga protocols can enhance treatment effectiveness, patient compliance, and sustainability of results, thereby reinforcing yoga as a scientifically validated and classically grounded therapeutic system.

### Ethical Considerations

Informed written consent was obtained from all patients prior to inclusion in this case series, permitting the use

of their anonymized clinical data for academic and publication purposes. Patient identities were kept strictly confidential. As this study is a retrospective observational case series conducted in a non-institutional setting, approval from an Institutional Ethics Committee (IEC) was not available. Nevertheless, the study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.