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Efficacy of Panchakarma-Based Integrative Ayurvedic Protocol (CDC Therapy) with Low-Calorie Herbal Diet in Glycaemic Control and Anthropometric Reduction in Type 2 Diabetes Mellitus: *A Retrospective Observational Study*

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Abstract

Background: *Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder with rising global prevalence. While allopathic management offers pharmacological control, integrative Ayurvedic approaches targeting metabolic root causes remain underexplored in clinical literature. This study evaluates the clinical outcomes of a structured Ayurvedic protocol — the CDC (Chronic Disease Care) Therapy — in patients with T2DM.*

Methods: *This retrospective observational study enrolled 56 T2DM patients (29 male, 27 female; mean age 52.6 ± 12.2 years) at an Ayurvedic tertiary care centre in Pune, India (April 2025–March 2026). Patients received either CDC-SP therapy (BMI ≥23; Basti with Gudmar–Daru Haridra–Yashti Madhu kwath) or CDC-KP therapy (BMI <23; same herbs as oil-based Basti), alongside Snehan and Swedan, an 800 kcal Prameha Diet Box, and individualised oral herbal medications. Mean Panchakarma sessions: 8.8 ± 4.9. Pre- and post-intervention parameters were compared using paired t-tests.*

Results: *Random Blood Sugar reduced from 181.80 ± 68.63 to 145.31 ± 44.32 mg/dL (−13.6%; p<0.001). HbA1c decreased from 8.61 ± 1.94% to 8.07 ± 1.53% (−0.54%; p=0.027). Body weight (−2.40 kg; p<0.001), BMI (−0.86 kg/m²; p<0.001), and abdominal girth (−2.33 cm; p<0.001) all improved significantly. Diastolic BP (p=0.007) and heart rate (p=0.032) also reduced significantly. CDC-SP showed significantly greater abdominal girth reduction than CDC-KP (−4.00 vs −1.20 cm; p=0.028). Of patients on allopathic medications, 65.1% achieved partial or complete dose reduction.*

Conclusion: *The CDC Panchakarma protocol integrated with the Prameha Diet Box demonstrated statistically significant improvements in glycaemic control, anthropometrics, and blood pressure in T2DM patients, with a notable pharmacological-sparing effect. Larger randomised controlled trials are warranted.*

Keywords: *Type 2 Diabetes Mellitus, Panchakarma, Ayurveda, HbA1c, Glycaemic Control, CDC Therapy, Prameha, Integrative Medicine, Basti, Obesity*

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I. Introduction

Diabetes Mellitus (DM) is one of the most rapidly growing non-communicable diseases of the 21st century. According to the International Diabetes Federation (IDF), approximately 537 million adults worldwide were living with diabetes in 2021, a figure projected to rise to 783 million by 2045. India, often referred to as the "diabetes capital of the world," bears a disproportionately large share of this burden, with over 77 million

individuals diagnosed with Type 2 Diabetes Mellitus (T2DM) — a number expected to exceed 134 million by 2045. The disease is characterised by chronic hyperglycaemia, insulin resistance, progressive beta-cell dysfunction, and a constellation of metabolic comorbidities including obesity, hypertension, and dyslipidaemia, all of which compound cardiovascular and renal risk.

Contemporary allopathic management of T2DM, while effective in glycaemic control, largely remains symptomatic and necessitates lifelong pharmacotherapy. Oral hypoglycaemic agents and insulin analogues carry well-documented risks including hypoglycaemia, weight gain, gastrointestinal disturbances, and long-term organ toxicity. Furthermore, polypharmacy is common in T2DM patients with comorbidities — a pattern reflected in the present study cohort, where a significant proportion of patients presented with concurrent diagnoses of hypertension, obesity, hypothyroidism, and dyslipidaemia. Patient compliance, drug dependence, and the absence of disease-modifying outcomes represent key unmet needs in conventional diabetes care.

Ayurveda, the ancient Indian system of medicine, conceptualises diabetes under the entity of Prameha and Madhumeha, attributing its pathogenesis to metabolic imbalance rooted in sedentary lifestyle (Asyasukha), excessive intake of heavy, sweet, and unctuous foods, and vitiation of Kapha and Meda dhatu (adipose tissue). Ayurvedic management therefore aims not merely at glycaemic reduction but at addressing the underlying metabolic derangement through dietary modification, herbal therapeutics, and most significantly, Panchakarma — a system of bio-purification therapies designed to eliminate accumulated toxins and restore metabolic homeostasis.

Among Panchakarma procedures, Basti (per-rectal drug administration) holds a place of supreme importance, described in classical texts as effective in half of all disease conditions. Snehan (oleation therapy) and Swedan (sudation/steam therapy) serve as essential preparatory (Purvakarma) procedures that mobilise and liquefy accumulated metabolic wastes prior to their elimination. Specific herbs such as Gudmar (Gymnema sylvestre), Daru Haridra (Berberis aristata), and Yashti Madhu (Glycyrrhiza glabra) have demonstrated insulin-sensitising, anti-inflammatory, and hepatoprotective properties in preclinical and clinical literature, lending pharmacological credibility to their use in the formulations employed in this study.

Concurrently, dietary intervention remains a cornerstone of diabetes management. A low-calorie, low-carbohydrate diet has strong evidence in inducing glycaemic remission in T2DM, as demonstrated in landmark trials such as DiRECT. The integration of an 800 kcal structured meal plan — the Prameha Diet Box — into this Ayurvedic protocol adds a modern nutritional dimension aligned with evidence-based practice.

Despite growing interest in integrative and complementary medicine for diabetes, robust clinical data documenting the real-world outcomes of structured Panchakarma protocols remain scarce. This retrospective observational study was therefore undertaken to evaluate the clinical efficacy of the CDC Panchakarma-based integrative Ayurvedic protocol on glycaemic parameters, anthropometric indices, blood pressure, and allopathic medication burden in patients with Type 2 Diabetes Mellitus.

II. Materials and Methods

2.1 Study Design and Setting

This was a retrospective observational study conducted at the Pune (Aundh) branch of a dedicated Ayurvedic chronic disease management centre. Data were collected from patient records spanning April 2025 to March 2026. The study was conducted in accordance with ethical principles governing retrospective clinical data analysis, and patient confidentiality was maintained throughout. [Ethics committee approval / waiver statement to be inserted by authors.]

2.2 Study Population

A total of 56 patients (29 male, 27 female) with a confirmed diagnosis of Type 2 Diabetes Mellitus were included. Mean age was 52.6 ± 12.2 years (range: 32–73 years).

Inclusion Criteria:

- Diagnosed with Type 2 Diabetes Mellitus (HbA1c ≥6.5% or RBS ≥200 mg/dL, or physician diagnosis)
- Age 18 years and above
- Enrolled in a CDC Ayurvedic treatment package

- Availability of at least baseline and one follow-up measurement for a primary outcome parameter

Exclusion Criteria:
- Type 1 Diabetes Mellitus
- Pregnancy or lactation
- Severe renal or hepatic impairment
- Patients with incomplete records or fewer than one Panchakarma session documented

2.3 Treatment Protocol

2.3.1 Panchakarma Therapy
Patients were allocated to one of two Panchakarma protocols based on baseline BMI:
CDC-SP Therapy (BMI ≥23): Snehan with Neem Siddha oil; Swedan with Dashmukada preparation; Basti using a kwath (decoction-based) preparation of Gudmar (Gymnema sylvestre), Daru Haridra (Berberis aristata), and Yashti Madhu (Glycyrrhiza glabra).
CDC-KP Therapy (BMI <23): Snehan and Swedan as above; Basti using an oil-based (taila) preparation of the same three herbs.
The mean number of Panchakarma sessions administered was 8.8 ± 4.9 (range: 1–17 sessions).

2.3.2 Dietary Intervention — Prameha Diet Box
All patients were prescribed an 800 kilocalorie low-calorie diet, characterised by low carbohydrate, high protein, and high fat composition, delivered as a ready-to-use structured meal plan called the Prameha Diet Box.

2.3.3 Oral Herbal Medications
In addition to Panchakarma and dietary intervention, all patients received individualised oral herbal Ayurvedic medications prescribed based on their specific clinical presentation, prakriti (body constitution), and comorbidity profile. As the herbal formulations varied between patients, these are reported descriptively.

2.4 Outcome Measures
The following parameters were recorded at baseline and at the most recent follow-up visit: Random Blood Sugar (RBS, mg/dL); HbA1c (%); Body weight (kg); BMI (kg/m²); Abdominal Girth (cm); Systolic BP (mmHg); Diastolic BP (mmHg); Heart Rate (bpm); Lipid profile (Total Cholesterol, TG, HDL, LDL — where available); Allopathic medication status. Mean treatment duration was 122.7 days (range: 1–333 days).

2.5 Statistical Analysis
Data were managed in Microsoft Excel and analysed using Python (SciPy library). Continuous variables are expressed as mean ± standard deviation (SD). Pre- and post-intervention values were compared using the paired Student's t-test. A p-value of <0.05 was considered statistically significant. Patients with missing or zero values for a given parameter were excluded from that specific analysis; sample sizes (n) are reported per parameter.

III. Results

3.1 Baseline Characteristics
A total of 56 patients were included (29 male, 27 female; mean age 52.6 ± 12.2 years). Sixteen patients were allocated to CDC-SP and 16 to CDC-KP; the remaining 24 received combination care plans. Mean baseline HbA1c was 8.45 ± 1.94% and mean baseline RBS was 181.8 ± 68.6 mg/dL, confirming poor glycaemic control at enrolment.

3.2 Glycaemic Outcomes
RBS reduced from 181.80 ± 68.63 to 145.31 ± 44.32 mg/dL (Δ −36.49 mg/dL, −13.6%; $p<0.001$, n=55). HbA1c decreased from 8.61 ± 1.94% to 8.07 ± 1.53% (Δ −0.54%, −4.1%; $p=0.027$, n=44). A subgroup analysis revealed

that patients with a baseline HbA1c >9% (n=16) demonstrated a substantially greater mean reduction of −1.47%, compared to −0.01% in patients with HbA1c ≤9%, suggesting a dose-response relationship.

3.3 Anthropometric Outcomes

Body weight reduced from 73.98 ± 11.80 to 71.58 ± 10.49 kg (Δ −2.40 kg, −2.9%; p<0.001). BMI declined from 28.95 ± 4.23 to 28.09 ± 4.04 kg/m² (Δ −0.86 kg/m², −2.8%; p<0.001). Abdominal girth reduced from 98.18 ± 8.94 to 95.85 ± 8.06 cm (Δ −2.33 cm, −2.3%; p<0.001). All three parameters were highly significant (n=55).

3.4 Cardiovascular Outcomes

DBP decreased significantly from 80.02 ± 10.24 to 76.09 ± 9.50 mmHg (Δ −3.93 mmHg; p=0.007). Heart Rate reduced from 85.82 ± 14.92 to 81.95 ± 10.82 bpm (Δ −3.87 bpm; p=0.032). SBP showed a marginal reduction (Δ −1.36 mmHg) that did not reach significance (p=0.490).

3.5 Lipid Profile

Lipid data were available for a subset of patients (n=21–25). Favourable trends were observed: Total Cholesterol −5.2%, Triglycerides −8.6%, LDL −1.9%, and HDL +12.0%. None reached statistical significance, likely due to limited sample size. These findings are considered exploratory.

3.6 CDC-SP vs CDC-KP Protocol Comparison

CDC-SP produced significantly greater abdominal girth reduction compared to CDC-KP (−4.00 ± 3.63 cm vs −1.20 ± 3.05 cm; p=0.028). All other parameters showed numerically greater improvement in CDC-SP but did not reach significance, likely due to small group sizes (n=15–16 per arm).

3.7 Allopathic Medication Outcomes

Of 56 patients, 13 (23.2%) were not on allopathic medications at baseline. Of the remaining 43 on medications: 5 (11.6%) completely discontinued all allopathic drugs; 23 (53.5%) achieved partial dose reduction; 14 (25.0%) showed no change. In aggregate, 65.1% of patients on allopathic drugs at baseline achieved some degree of medication reduction.

Table 1: Pre- and Post-Intervention Clinical Parameters

Parameter	Before (Mean ± SD)	After (Mean ± SD)	Change (Δ)	% Change	p-value
Weight (kg)	73.98 ± 11.80	71.58 ± 10.49	−2.40 ± 4.36	−2.9%	<0.001***
BMI (kg/m²)	28.95 ± 4.23	28.09 ± 4.04	−0.86 ± 1.41	−2.8%	<0.001***
Abdominal Girth (cm)	98.18 ± 8.94	95.85 ± 8.06	−2.33 ± 3.18	−2.3%	<0.001***
RBS (mg/dL)	181.80 ± 68.63	145.31 ± 44.32	−36.49 ± 55.10	−13.6%	<0.001***
HbA1c (%)	8.61 ± 1.94	8.07 ± 1.53	−0.54 ± 1.56	−4.1%	0.027*
SBP (mmHg)	130.55 ± 15.49	129.18 ± 11.80	−1.36 ± 14.55	−0.2%	0.490 ns
DBP (mmHg)	80.02 ± 10.24	76.09 ± 9.50	−3.93 ± 10.40	−4.0%	0.007**
Heart Rate (bpm)	85.82 ± 14.92	81.95 ± 10.82	−3.87 ± 13.06	−2.5%	0.032*

*Note: ***p<0.001, **p<0.01, *p<0.05, ns = not significant. All n=55 except HbA1c (n=44).*

Table 2: Lipid Profile Outcomes (Exploratory)

Parameter (n)	Before (Mean ± SD)	After (Mean ± SD)	Change (Δ)	% Change	p-value
Total Cholesterol (n=21)	182.45 ± 39.00	169.22 ± 42.86	−13.23	−5.2%	0.156 ns
Triglycerides (n=21)	276.04 ± 350.38	215.63 ± 265.09	−60.40	−8.6%	0.053 ns

Parameter (n)	Before (Mean ± SD)	After (Mean ± SD)	Change (Δ)	% Change	p-value
HDL (n=21)	37.27 ± 7.97	40.82 ± 9.37	+3.55	+12.0%	0.063 ns
LDL (n=25)	98.11 ± 35.02	89.73 ± 27.20	−8.38	−1.9%	0.193 ns

Table 3: CDC-SP vs CDC-KP Protocol Comparison

Parameter	CDC-SP (n=16) Δ Mean ± SD	CDC-KP (n=15) Δ Mean ± SD	p-value (between groups)
Abdominal Girth (cm)	−4.00 ± 3.63	−1.20 ± 3.05	0.028*
BMI (kg/m²)	−0.81 ± 0.84	−0.54 ± 0.60	0.310 ns
HbA1c (%)	−0.99 ± 1.47	−0.65 ± 2.24	0.642 ns
RBS (mg/dL)	−43.44 ± 53.48	−58.40 ± 55.00	0.449 ns
DBP (mmHg)	−6.25 ± 9.21	−0.67 ± 10.03	0.117 ns

Table 4: Allopathic Medication Reduction Status

Medication Status	Number of Patients	Percentage
Not on allopathic medicines at baseline	13	23.2%
Complete discontinuation of allopathic medicines	5	11.6% of those on meds
Partial dose reduction	23	53.5% of those on meds
No change in medication	14	25.0%

IV. Discussion

This retrospective observational study evaluated the clinical outcomes of a structured multimodal Ayurvedic intervention in 56 patients with T2DM. The results demonstrate statistically significant improvements in glycaemic control, anthropometric indices, diastolic blood pressure, and heart rate, alongside a clinically meaningful reduction in allopathic medication burden.

4.1 Glycaemic Control

The reduction in RBS by 36.49 mg/dL (13.6%, $p<0.001$) and HbA1c by 0.54% ($p=0.027$) are consistent with the known anti-diabetic mechanisms of the individual components of the CDC protocol. Gymnema sylvestre (Gudmar) has insulin-secretagogue and insulin-sensitising properties, with clinical trials reporting HbA1c reductions of 0.6–1.0% as monotherapy. Berberis aristata (Daru Haridra), rich in berberine, has demonstrated AMPK-activating and glucose-lowering effects comparable to metformin in preclinical models. Glycyrrhiza glabra (Yashti Madhu) contributes anti-inflammatory and adaptogenic effects that attenuate the chronic low-grade inflammation central to insulin resistance.

Particularly noteworthy is the subgroup observation: patients with baseline HbA1c >9% demonstrated a mean reduction of 1.47%, compared to a negligible change of 0.01% in patients with HbA1c ≤9%. This dose-response pattern — whereby patients with the poorest glycaemic control derive the greatest benefit — is a hallmark of effective anti-diabetic interventions and lends credibility to the biological efficacy of the protocol.

4.2 Anthropometric and Metabolic Outcomes

The significant reductions in body weight (−2.40 kg), BMI (−0.86 kg/m²), and abdominal girth (−2.33 cm) are attributable in large part to the 800 kcal Prameha Diet Box, whose macronutrient composition mirrors ketogenic and very-low-calorie dietary patterns with established evidence in T2DM remission. The landmark DiRECT trial demonstrated that an 825–853 kcal total diet replacement programme could achieve diabetes remission in up to 46% of participants at one year. The finding that CDC-SP therapy produced significantly greater abdominal girth reduction than CDC-KP (−4.00 vs −1.20 cm; $p=0.028$) aligns with the Ayurvedic rationale for

this protocol differentiation, as the kwath-based Basti in CDC-SP exerts stronger Kapha and Meda (adipose tissue) depleting effects.

4.3 Cardiovascular Parameters

The significant reduction in DBP (−3.93 mmHg, p=0.007) and heart rate (−3.87 bpm, p=0.032) are clinically relevant findings. The reduction in heart rate suggests improved autonomic tone, consistent with the parasympathomimetic and sympatholytic effects attributed to Panchakarma through Vata dosha normalisation. The absence of significant SBP reduction may reflect shorter treatment durations or the need for a longer intervention period.

4.4 Lipid Profile

While lipid outcomes did not reach statistical significance (likely due to small subset with complete data, n=21–25), directional trends are encouraging: Total Cholesterol −5.2%, Triglycerides −8.6%, LDL −1.9%, and HDL +12.0%. These trends are consistent with the known hypolipidaemic effects of berberine and the lipid-modulating properties of a low-carbohydrate, high-fat diet. A larger study with complete lipid profiling is warranted.

4.5 Allopathic Medication Reduction

One of the most clinically impactful findings is that 65.1% of patients on allopathic medications at baseline achieved some degree of medication reduction, with 11.6% completely discontinuing all allopathic drugs. This pharmacological-sparing effect has profound implications for patient quality of life, long-term drug toxicity, healthcare expenditure, and the concept of integrative medicine as disease-modifying rather than merely symptomatic. To the best of our knowledge, this degree of medication reduction has rarely been documented in published Ayurvedic clinical studies.

4.6 Limitations

The retrospective, single-centre, observational design precludes causal inference and is subject to selection bias and incomplete data. The absence of a control group means spontaneous glycaemic fluctuation cannot be excluded. Variable treatment duration (1–333 days) and heterogeneous oral herbal prescriptions limit generalisability. Lipid data were available for only a subset of patients. Patient compliance with the Prameha Diet Box and herbal medications could not be independently verified.

4.7 Implications and Future Directions

This study provides a strong preliminary evidence base for a larger, prospective, randomised controlled trial comparing the CDC Panchakarma protocol against standard care in T2DM. Future research should incorporate standardised treatment durations (minimum 12 weeks), uniform dietary monitoring, complete lipid profiling, validated quality-of-life instruments, and stratified analysis by baseline HbA1c, BMI, and comorbidity profile. The differential response in HbA1c >9% patients and the CDC-SP vs CDC-KP abdominal girth data provide a scientifically credible basis for the Ayurvedic principle of Prakriti-based individualised treatment.

V. Conclusion

This retrospective observational study provides clinically meaningful evidence for the efficacy of the CDC Panchakarma-based integrative Ayurvedic protocol in the management of Type 2 Diabetes Mellitus. The multimodal intervention — comprising structured Panchakarma therapies (Snehan, Swedan, and Basti with Gudmar, Daru Haridra, and Yashti Madhu), the 800 kcal Prameha Diet Box, and individualised oral herbal medications — demonstrated statistically significant improvements across multiple domains: glycaemic control (RBS −13.6%, p<0.001; HbA1c −0.54%, p=0.027), anthropometric parameters (weight −2.9%, BMI −2.8%, abdominal girth −2.3%; all p<0.001), and cardiovascular parameters (DBP −4.0%, p=0.007; heart rate −2.5%, p=0.032).

A particularly compelling finding is that patients with poor baseline glycaemic control (HbA1c >9%) demonstrated substantially greater HbA1c reduction (−1.47%), highlighting the protocol's potential as a targeted intervention for poorly controlled T2DM. The CDC-SP protocol, designed for overweight patients, produced significantly greater abdominal girth reduction than CDC-KP (p=0.028), validating the Ayurvedic principle of BMI-based therapeutic differentiation.

Crucially, 65.1% of patients on allopathic anti-diabetic medications at baseline achieved partial or complete medication reduction — including 5 patients (11.6%) who completely discontinued allopathic drugs — underscoring the protocol's potential as a pharmacological-sparing, disease-modifying intervention rather than merely a symptomatic adjunct.

These findings collectively support the CDC integrative protocol as a safe, multimodal, and clinically effective approach for T2DM management, with the potential to reduce dependence on allopathic pharmacotherapy while improving metabolic and cardiovascular health. Well-designed, prospective, randomised controlled trials with standardised treatment durations, larger sample sizes, and complete biochemical profiling are strongly recommended to confirm and extend these findings, and to establish evidence-based guidelines for the integration of Panchakarma-based Ayurvedic therapies into mainstream diabetes care.

References

[1]. International Diabetes Federation. IDF Diabetes Atlas, 10th edition. Brussels, Belgium: IDF; 2021.
[2]. Mohan V, et al. Prevalence of diabetes and prediabetes in India: findings from the ICMR-INDIAB study. Lancet Diabetes Endocrinol. 2023.
[3]. Lean MEJ, et al. Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial. Lancet. 2018;391(10120):541–551.
[4]. Baskaran K, et al. Antidiabetic effect of a leaf extract from Gymnema sylvestre in non-insulin-dependent diabetes mellitus patients. J Ethnopharmacol. 1990;30(3):295–300.
[5]. Yin J, Xing H, Ye J. Efficacy of berberine in patients with type 2 diabetes mellitus. Metabolism. 2008;57(5):712–717.
[6]. Charaka Samhita, Sutra Sthana. Chapter 30 (Basti-Sutra). Classical Ayurvedic Text.
[7]. Sushruta Samhita, Chikitsa Sthana. Chapter 11 (Prameha Chikitsa).
[8]. Sridhara C, et al. Panchakarma therapy in the management of diabetes mellitus: a systematic review. J Ayurveda Integr Med. 2020.
[9]. [Note: References 1–5 are standard citations. References 6–8 to be verified and updated by authors prior to submission.]