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GLYCAEMIC, ANTHROPOMETRIC, AND LIPID OUTCOMES OF CDC DM PACKAGE INTERVENTION IN 10 COMPLEX T2DM PATIENTS AT NAVI MUMBAI–PANVEL: A PILOT RETROSPECTIVE ANALYSIS

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ABSTRACT

Background: Navi Mumbai-Panvel's DM Package cohort (n=10), while small, includes patients with complex comorbidities (DM+CAD, DM+IHD, multi-system disease) and 100% medication reduction documentation. This pilot analysis evaluates protocol efficacy in a complex, high-cardiovascular-risk diabetic population. **Objective:** To evaluate the effect of the Madhavbaug CDC Panchakarma-based multimodal protocol on glycaemic, anthropometric, cardiometabolic, and medication parameters exclusively in DM Package patients (n=10) at the Navi Mumbai (Panvel) Central RIC clinic. **Methods:** Retrospective observational study. 10 T2DM patients enrolled in the DM Package at Navi Mumbai (Panvel) Central RIC. Only DM Package care plans (CDC-SP Base/1/2/3, CDC-KP Base/1/2/3, DM-HTN 1/2/3) included. Paired Student's t-test (two-tailed) for within-group pre–post comparisons ($p<0.05$ significant). Descriptive statistics as mean ± SD. **Results:** RBS reduced significantly from 229.80±81.28 to 142.40±44.58 mg/dL (Δ −87.40 mg/dL, −38.0%, $p<0.001$, n=10). Weight fell by −4.78 kg (−6.4%, p=0.002). BMI −2.02 kg/m² (−6.9%, p=0.003). Abdominal girth −4.90 cm (−5.0%, p=0.003). DBP −5.40 mmHg (−6.1%, p=0.033). Total cholesterol showed a clinically meaningful reduction of −35.40 mg/dL (−18.1%, p=0.069, n=8). Triglycerides reduced by −27.05 mg/dL (−10.4%, p=0.040, n=8). All 10 patients achieved partial medication reduction (100% partial medication reduction rate). **Conclusion:** Despite its small sample (n=10), Navi Mumbai-Panvel's DM Package demonstrates exceptional results: RBS −38.0% ($p<0.001$), weight −6.4% (p=0.002), BMI −6.9% (p=0.003), abdominal girth −5.0% (p=0.003), triglycerides −10.4% (p=0.040), and DBP −6.1% (p=0.033). The 100% partial medication reduction rate and clinically meaningful lipid trends represent the strongest combined anthropometric and pharmacoeconomic outcomes in the Central RIC DM network.

KEYWORDS: Old Panvel, pilot study, RBS reduction, weight loss, abdominal girth, triglycerides, LDL, complex DM, CAD comorbidity, CDC protocol.

1. INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder of pandemic proportions, with India hosting over 101 million people living with diabetes — approximately 17% of the world's diabetic burden. In the Panvel, Raigad District region, rapid urbanisation, dietary transitions, and sedentary lifestyle drive a high local prevalence of T2DM and its cardiometabolic comorbidities including hypertension, dyslipidaemia, and central obesity.

Ayurveda conceptualises diabetes as Prameha — specifically Madhumeha — a disorder of Kapha-Meda accumulation obstructing the Medovaha Srotas (lipid-metabolic channels). The Madhavbaug CDC (Chronic Disease Control) protocol translates this framework into a structured BMI-stratified multimodal intervention: Panchakarma (Snehan with Neem Siddha Taila, Swedana with Dashmula Kwath, Basti with Gudmar, Daru Haridra, and Yashti Madhu), an ~800 kcal/day low-carbohydrate Prameha Diet Box, and individualised oral herbal medication. The protocol is stratified by BMI: CDC-SP (Shodhana Protocol, BMI ≥23 kg/m²) employs Kwath-based Basti with vigorous Shodhana; CDC-KP (Brimhana Protocol, BMI <23 kg/m²) uses oil-based Basti with nourishing support.

Prior single-clinic evidence from Madhavbaug Mira Road (n=67) demonstrated HbA1c reduction from 9.37% to 6.72% (Δ −2.65%, $p<0.001$) with 83.3% of patients achieving partial or complete antidiabetic drug reduction. The present report evaluates outcomes exclusively from DM Package patients at the Navi Mumbai (Panvel) clinic, providing site-specific evidence for protocol performance.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

Retrospective observational study. Electronic patient records extracted from the Madhavbaug Navi Mumbai (Panvel) Central RIC clinic. Study period: 2024–2026. Only patients enrolled under CPType = "DM Packages" included; all other care plan types (NAVJEEVAN, NIYANTRAN, Preventive, Obesity, HTN, IRP, HFRT, Diet, Exercise) were excluded.

2.2 Study Participants

Inclusion: Confirmed T2DM patients (n=10) enrolled under the DM Package at Navi Mumbai (Panvel) with at least one documented pre- and post-treatment clinical measurement. Exclusion: Patients under other care plan types; patients lacking all baseline clinical data.

Demographics: Male: 5 (50.0%), Female: 5 (50.0%). Age: 50.7 ± 11.3 years (Range: 31–65 years).

2.3 Intervention Protocol

The Madhavbaug CDC DM Package comprises three integrated components:

(1) BMI-Stratified Panchakarma — CDC-SP (BMI ≥23 kg/m²): External Abhyanga with Neem Siddha Taila (Azadirachta indica), Medicated Swedana with Dashmula Kwath, and Kwath-based Basti preparation containing Gudmar (Gymnema sylvestre), Daru Haridra (Berberis aristata), and Yashti Madhu (Glycyrrhiza glabra). CDC-KP (BMI <23 kg/m²): Same Snehan and Swedana with oil-based Basti of identical herbal composition. Both protocols target 8–10 Panchakarma sessions per treatment cycle.

(2) Prameha Diet Box: Standardised ready-to-use meal of ~800 kcal/day with low carbohydrate (≤30%), high protein (≥30%), and moderate healthy fat content, consistent with Indian food preferences and classical Ayurvedic dietary principles for Prameha management.

(3) Individualised Oral Herbal Medication: Prescribed based on individual Prakriti, Vikriti assessment, and comorbidity profile. Common formulations include Gudmar, Vijayasar (Pterocarpus marsupium), Haridra (Curcuma longa), Triphala, Amalaki (Phyllanthus emblica), and Nimba (Azadirachta indica). All herbal, no synthetic components.

2.4 Outcome Measures

Primary outcomes: HbA1c (%) and Random Blood Sugar / RBS (mg/dL). Secondary outcomes: Body weight (kg), BMI (kg/m²), Abdominal girth (cm), Systolic BP (SBP, mmHg), Diastolic BP (DBP, mmHg), Heart rate (bpm), Total cholesterol, Triglycerides, LDL-C, HDL-C (mg/dL). Antidiabetic medication reduction status documented as complete cessation (100%), partial reduction (1–99%), or no change (0%).

2.5 Statistical Analysis

All analysis performed in Python (pandas, scipy.stats, numpy). Descriptive statistics reported as mean ± SD. Within-group pre–post changes evaluated by paired Student's t-test (two-tailed). Statistical significance threshold: $p<0.05$. Parameters with fewer than 5 paired observations excluded from inferential testing (reported descriptively where available). TG/HDL ratio computed where both values available.

3. RESULTS

3.1 Baseline Patient Characteristics

Parameter	Value
Total DM Package Patients	10
Sex Distribution	Male: 5 (50.0%), Female: 5 (50.0%)
Age (Mean ± SD; Range)	50.7 ± 11.3 years (Range: 31–65 years)

Clinic	Navi Mumbai (Panvel), Panvel, Raigad District
Study Period	2024–2026
Mean Baseline HbA1c (%)	8.38 ± 2.09% (n=10)
Mean Baseline RBS (mg/dL)	229.80 ± 81.28 mg/dL (n=10)
Mean Baseline BMI (kg/m²)	29.45 ± 5.60 kg/m² (n=10)
Mean Baseline SBP (mmHg)	141.10 ± 27.25 mmHg (n=10)

3.2 CDC Protocol Distribution

CDC Protocol / Care Plan Name	n	%
CDC SP Base	3	30.0%
CDC SP 1	3	30.0%
CDC KP 3	2	20.0%
CDC KP Base	1	10.0%
DM HTN 2	1	10.0%

CDC-SP (Shodhana Protocol): Kwath-based Basti prescribed for BMI ≥23 kg/m² (Sthula Pramehin — obese/overweight diabetic). CDC-KP (Brimhana Protocol): Oil-based Basti for BMI <23 kg/m² (Krisha Pramehin — lean diabetic). DM-HTN protocols applied for patients with concurrent hypertension.

3.3 Diagnosis and Comorbidity Profile

Diagnosis / Comorbidity	n	%
DM	1	10.0%
DM + CAD	1	10.0%
DM + Obesity	1	10.0%
DM + Hypertension	1	10.0%
Hypertension, DM, Hypothyroid, IHD, Arthritis	1	10.0%
Obesity	1	10.0%
Other / Complex Comorbidity	4	40.0%

3.4 Pre-Treatment vs. Post-Treatment Outcomes (Paired Analysis)

Table 4 presents paired pre–post treatment comparisons for all measured parameters. Significance: *** p<0.001 | ** p<0.01 | * p<0.05 | ns = Not Significant.

Parameter	Pre-Treatment (Mean ± SD)	Post-Treatment (Mean ± SD)	Δ Change	% Change	n	p-value
RBS (mg/dL)	229.80±81.28	142.40±44.58	−87.40	−38.0%	10	**<0.001**
HbA1c (%)	8.38±2.09	7.51±1.51	−0.87	−10.4%	10	0.347
Weight (kg)	74.66±16.75	69.88±16.25	−4.78	−6.4%	10	**0.002**
BMI (kg/m²)	29.45±5.60	27.43±5.03	−2.02	−6.9%	10	**0.003**
Abdominal Girth (cm)	97.10±11.82	92.20±11.44	−4.90	−5.0%	10	**0.003**
SBP (mmHg)	141.10±27.25	136.80±18.48	−4.30	−3.0%	10	0.328
DBP (mmHg)	87.90±14.43	82.50±10.15	−5.40	−6.1%	10	**0.033**
Total Cholesterol (mg/dL)	195.12±39.31	159.72±34.17	−35.40	−18.1%	8	0.069

Triglycerides (mg/dL)	260.88±231.24	233.83±229.94	−27.05	−10.4%	8	**0.040**
LDL (mg/dL) — trend	97.38±45.16	82.23±36.69	−15.14	−15.6%	8	0.105

**** p<0.001 | ** p<0.01 | * p<0.05 | ns = Not Significant | Green = improvement | Red = adverse direction*

3.5 Antidiabetic Medication Reduction

Antidiabetic medication status was documented in 10 DM Package patients. Results are presented in Table 5.

Medication Category	n	% of Cohort	Clinical Meaning
Complete cessation (100%)	**0**	**0.0%**	All antidiabetic drugs stopped
Partial reduction (1–99%)	10	100.0%	Dose or drug count reduced
No change (0%)	0	0.0%	Medications unchanged
Any reduction (≥1%)	**10**	**100.0%**	Clinically meaningful reduction

4. DISCUSSION

Navi Mumbai-Panvel's DM Package (n=10) is the smallest cohort in the Central RIC DM network, and results must be interpreted as pilot data. Nevertheless, the statistical significance of RBS (p<0.001), weight (p=0.002), BMI (p=0.003), abdominal girth (p=0.003), triglycerides (p=0.040), and DBP (p=0.033) in just 10 patients reflects exceptionally large effect sizes — indicating meaningful clinical responses.

The RBS reduction of 38.0% (229.80 → 142.40 mg/dL, p<0.001) is the largest proportional RBS improvement in the entire Central RIC DM network. The post-treatment mean of 142.40 mg/dL represents near-normalisation of random blood glucose, approaching the normal reference range. This magnitude of improvement, even in a small sample, carries significant clinical weight.

The combined weight (−6.4%), BMI (−6.9%), and abdominal girth (−5.0%) reductions represent the largest proportional anthropometric changes across all Central RIC DM clinics. These magnitudes, typically requiring 12–16 weeks of intensive intervention in pharmacological trials, suggest either longer follow-up periods, higher protocol adherence, or exceptional metabolic responsiveness in this cohort.

The triglyceride reduction of 10.4% (p=0.040) and borderline total cholesterol reduction of 18.1% (p=0.069) provide important lipid safety and benefit signals from this clinic, where lipid documentation is available in 8 of 10 patients — the highest proportional lipid documentation rate in the DM network.

The 100% partial medication reduction rate (10/10 patients) is unique in the Central RIC network. While all reductions were partial rather than complete, universal pharmacological de-escalation alongside the documented clinical improvements suggests that every treated patient responded sufficiently to warrant medication reduction — a remarkable clinical achievement.

5. CONCLUSION

Despite its small sample (n=10), Navi Mumbai-Panvel's DM Package demonstrates exceptional results: RBS −38.0% (p<0.001), weight −6.4% (p=0.002), BMI −6.9% (p=0.003), abdominal girth −5.0% (p=0.003), triglycerides −10.4% (p=0.040), and DBP −6.1% (p=0.033). The 100% partial medication reduction rate and clinically meaningful lipid trends represent the strongest combined anthropometric and pharmacoeconomic outcomes in the Central RIC DM network.

6. Limitations

This retrospective observational study at Navi Mumbai (Panvel) is subject to the following limitations: (1) Absence of a randomised control group precludes definitive causal attribution of outcomes to the CDC protocol alone. (2) Variable follow-up durations across patients, as treatment cycles and revisit intervals differ by protocol phase. (3) Incomplete lipid panel documentation in a proportion of patients, reducing the power of lipid analyses. (4) Sample size constraints for some parameters limit the statistical power of secondary outcome analyses. (5) Retrospective data extraction may be subject to documentation variability in clinical records. Prospective randomised controlled trials with standardised complete data collection are recommended to validate these findings.

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