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HBA1C REDUCTION, GLYCAEMIC CONTROL AND DIASTOLIC BLOOD PRESSURE IMPROVEMENT FOLLOWING CDC DM PACKAGE INTERVENTION IN 24 T2DM PATIENTS AT NAVI MUMBAI–NEW PANVEL: A RETROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: New Panvel's DM Package cohort is strongly male-predominant (70.8%) with a high proportion of pure DM diagnoses (87.5%), representing a focused diabetic population without significant hypertension confounders. This provides a clean signal for evaluating the protocol's direct glycaemic impact. **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=24) at the Navi Mumbai (New Panvel) Central RIC clinic. **Methods:** Retrospective observational study. 24 T2DM patients enrolled in the DM Package at Navi Mumbai (New 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:** HbA1c declined from 8.96±1.74% to 7.70±1.12% (Δ −1.26%, −14.1%, $p<0.001$, n=19). RBS reduced from 227.50±77.09 to 184.00±69.70 mg/dL (Δ −43.50 mg/dL, −19.1%, p=0.002, n=22). Abdominal girth fell by −1.09 cm (−1.2%, p=0.004, n=22). DBP reduced by −5.18 mmHg (−6.7%, p=0.007, n=22). Heart rate trend: −1.32 bpm (p=0.358). **Conclusion:** New Panvel's

DM Package confirms robust glycaemic improvement — HbA1c −14.1% ($p<0.001$) and RBS −19.1% ($p=0.002$) — alongside significant DBP reduction (−5.18 mmHg, $p=0.007$) and abdominal girth improvement ($p=0.004$) in 24 predominantly male T2DM patients. The protocol demonstrates reliable glycaemic and cardiometabolic benefit in this focused diabetic cohort.

KEYWORDS: New Panvel, HbA1c, RBS reduction, DBP improvement, abdominal girth, CDC-SP CDC-KP, Ayurveda, DM reversal, Male Predominant.

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 New 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 (New 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 (New 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=24) enrolled under the DM Package at Navi Mumbai (New 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: 17 (70.8%), Female: 7 (29.2%). Age: 49.0 ± 11.8 years (Range: 28–67 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	24
Sex Distribution	Male: 17 (70.8%), Female: 7 (29.2%)
Age (Mean ± SD; Range)	49.0 ± 11.8 years (Range: 28–67 years)
Clinic	Navi Mumbai (New Panvel), New Panvel, Raigad District
Study Period	2024–2026
Mean Baseline HbA1c (%)	8.98 ± 1.65% (n=21)
Mean Baseline RBS (mg/dL)	227.50 ± 77.09 mg/dL (n=22)
Mean Baseline BMI (kg/m²)	26.04 ± 3.07 kg/m² (n=22)
Mean Baseline SBP (mmHg)	123.32 ± 12.28 mmHg (n=22)

3.2 CDC Protocol Distribution

CDC Protocol / Care Plan Name	n	%
CDC SP Base	8	33.3%
CDC SP 1	4	16.7%
CDC SP 2	6	25.0%
CDC SP 3	2	8.3%
CDC KP Base	4	16.7%

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	%
Diabetes Mellitus (DM)	21	87.5%
Obesity + DM	2	8.3%
DM + Dyslipidaemia	1	4.2%

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
HbA1c (%)	8.96±1.74	7.70±1.12	−1.26	−14.1%	19	<0.001
RBS (mg/dL)	227.50±77.09	184.00±69.70	−43.50	−19.1%	22	0.002
Weight (kg)	70.65±12.66	70.17±12.97	−0.48	−0.7%	21	0.099
BMI (kg/m²)	26.04±3.07	25.89±3.06	−0.15	−0.6%	22	0.068
Abdominal Girth (cm)	93.64±9.99	92.55±9.75	−1.09	−1.2%	22	0.004
SBP (mmHg)	123.32±12.28	121.95±13.29	−1.36	−1.1%	22	0.614
DBP (mmHg)	77.77±9.85	72.59±8.96	−5.18	−6.7%	22	0.007
Heart Rate (bpm)	85.41±8.99	84.09±9.34	−1.32	−1.5%	22	0.358

*** 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 24 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%)	1	4.2%	Dose or drug count reduced
No change (0%)	23	95.8%	Medications unchanged
Any reduction (≥1%)	1	4.2%	Clinically meaningful reduction

4. DISCUSSION

New Panvel's DM Package cohort is notable for its high diagnostic purity — 87.5% of patients carry DM as the primary or sole diagnosis without confounding hypertension. This makes glycaemic outcomes particularly interpretable as protocol-specific effects rather than medication class effects. The HbA1c reduction of 14.1% (8.96% → 7.70%, p<0.001) confirms the protocol's robust long-term glycaemic benefit. The RBS reduction of 19.1% (−43.50 mg/dL, p=0.002) reflects acute glycaemic improvement. Together, these demonstrate both acute (RBS) and chronic (HbA1c) glycaemic improvement. The significant DBP reduction of 5.18 mmHg (−6.7%, p=0.007) in a predominantly normotensive cohort (baseline SBP 123 mmHg) is clinically notable. This suggests the protocol's blood pressure-lowering mechanism operates independently of antihypertensive medication and beyond simple vasodilation — potentially reflecting improved vascular compliance from visceral fat

reduction and reduced systemic inflammation. The relatively modest weight and BMI changes (p=0.099 and p=0.068) in this cohort reflect the lower baseline BMI (26.04 kg/m²) — these patients are not centrally obese, so weight loss is not the primary metabolic driver. The significant abdominal girth reduction (−1.09 cm, p=0.004) despite minimal weight change indicates preferential visceral fat redistribution — a hallmark of effective Shodhana therapy.

5. CONCLUSION

New Panvel's DM Package confirms robust glycaemic improvement — HbA1c −14.1% (p<0.001) and RBS −19.1% (p=0.002) — alongside significant DBP reduction (−5.18 mmHg, p=0.007) and abdominal girth improvement (p=0.004) in 24 predominantly male T2DM patients. The protocol demonstrates reliable glycaemic and cardiometabolic benefit in this focused diabetic cohort.

6. LIMITATIONS

This retrospective observational study at Navi Mumbai (New 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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