

CLINICAL EVALUATION OF MUSTADIKWATHGHANA VATI IN TYPE 2 DIABETES MELLITUS: AN AYURVEDIC CASE STUDY

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Abstract:

Type 2 Diabetes Mellitus (T2DM) is a chronic, multifactorial metabolic disorder characterized by insulin resistance, β -cell dysfunction, and systemic metabolic imbalance. In Ayurveda, this condition correlates with Prameha, particularly Madhumeha, caused by derangement of Kapha, Meda, and Kleda along with impaired Agni. Modern management of T2DM focuses on glycaemic control, yet often neglects the underlying metabolic, oxidative, and inflammatory mechanisms. Mustadikwathghana Vati, an Ayurvedic polyherbal formulation containing *Cyperus rotundus* (Musta) and other Kaphahara-Medohara herbs, is described in classical texts as effective in Prameha. This single-case clinical study aimed to evaluate its therapeutic efficacy as an adjuvant in T2DM. A 52-year-old male with classical diabetic symptoms (Prabhuta Mutrata, Pipasa, Daurbalya) was treated with Mustadikwathghana Vati (500 mg twice daily before meals) for 90 days along with a regulated diet and lifestyle regimen. Outcomes were assessed through clinical and biochemical parameters—FBS, PPBS, HbA1c, BMI, and lipid profile—recorded at baseline and monthly intervals. Marked improvement was observed: FBS declined from 210 to 124 mg/dL, PPBS from 320 to 172 mg/dL, and HbA1c from 8.9 to 6.8%. Lipid profile and BMI also improved, accompanied by ~75% symptomatic relief without adverse effects. Pharmacological actions such as Deepana-Pachana, Medohara, and Kleda-Shoshana contributed to the therapeutic outcome. The results suggest Mustadikwathghana Vati acts through both traditional and molecular mechanisms—enhancing insulin sensitivity, modulating oxidative stress, and restoring Agni. This case reinforces the potential of integrative Ayurvedic therapy as a safe, holistic adjunct in T2DM management.

Keywords: Mustadikwathghana Vati, Prameha, Type 2 Diabetes Mellitus, Ayurveda, *Cyperus rotundus*, Glycaemic Control

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) represents over 90% of diabetes cases worldwide, and its prevalence continues to escalate due to sedentary lifestyles, poor dietary choices, and genetic predisposition^[1,2]. India alone contributes nearly 77 million diabetics, making it the global epicenter of this metabolic epidemic^[3]. While pharmacological therapies such as Metformin, sulfonylureas, and DPP-4 inhibitors have proven effective in controlling hyperglycemia, they rarely correct the underlying pathophysiological mechanisms such as insulin resistance, oxidative stress, and lipid dysregulation^[4]. Long-term use of these agents can also cause gastrointestinal intolerance, hypoglycemia, or hepatic strain^[5].

Ayurveda, a time-tested system of holistic medicine, provides a broader view of metabolic disorders through the lens of *Prameha*, encompassing conditions characterized by excessive urination, deranged lipid metabolism, and loss of tissue integrity (*Dhatu Shathilya*)^[6]. The disease originates from indulgence in *Madhura-Snigdha-Guru Ahara* (sweet, oily, heavy diet), *Avyayama* (lack of exercise), and *Divaswapna* (daytime sleep), which aggravate *Kapha* and *Meda*

dhatu, leading to *Agnimandya* (weak digestion) and *Srotorodha* (obstruction of channels)^[7,8].

In this framework, T2DM parallels *Kaphaja Prameha*, evolving into *Madhumeha* as *Vata* predominates during chronic stages^[9]. Classical texts like *Charaka Samhita* and *Sushruta Samhita* prescribe *Deepana-Pachana* (digestive and metabolic enhancement), *Shodhana* (purification), and *Shamana* (palliative therapy) as key strategies^[10,11]. Among these, Mustadikwathghana Vati a compound preparation containing *Musta* (*Cyperus rotundus*), *Triphala*, *Haridra* (*Curcuma longa*), *Devadaru* (*Cedrus deodara*), and *Lodhra* (*Symplocos racemosa*)—is renowned for *Kaphahara*, *Medohara*, and *Mutrakricchrahara* actions^[12].

Scientific studies corroborate these classical claims: *Cyperus rotundus* exhibits antihyperglycaemic effects through PPAR- γ activation and α -glucosidase inhibition, *Curcuma longa* enhances insulin sensitivity and reduces oxidative stress, and *Triphala* improves lipid metabolism^[13–16]. Collectively, these pharmacological effects align with Ayurvedic mechanisms of *Agni Deepana*, *Ama Pachana*, and *Rasayana* (rejuvenation).

Thus, exploring the clinical efficacy of Mustadikwathghana Vati in managing T2DM not only bridges traditional and modern science but also validates Ayurveda's systems biology approach - targeting multiple metabolic pathways rather than a single biochemical target^[17,18].

Background: *Prameha* encompasses 20 subtypes categorized under *Kaphaja*, *Pittaja*, and *Vataja* varieties, each representing progressive metabolic deterioration^[19]. The early stages correspond to insulin resistance, while later stages reflect β -cell exhaustion and glucotoxicity. The *Samprapti* (pathogenesis) involves accumulation of *Meda* and *Kleda* due to *Agnimandya*, leading to disturbed glucose and lipid metabolism^[20].

Ayurvedic management focuses on *Nidana Parivarjana* (elimination of causative factors), *Shodhana* (detoxification through Panchakarma), and *Shamana* (pacification therapy). Mustadikwathghana Vati belongs to the *Shamana* category, acting through *Deepana*, *Pachana*, *Medohara*, and *Kleda Shoshana*^[21]. Preclinical research demonstrates that *Cyperus rotundus* extracts significantly reduce blood glucose levels, enhance antioxidant enzyme activity, and restore hepatic glycogen^[22,23]. This background forms the rationale for its clinical evaluation in T2DM.

Problem Statement: Despite numerous oral antidiabetic drugs, many patients fail to achieve long-term glycaemic stability or metabolic normalization. Conventional therapy targets glucose levels but neglects systemic metabolic dysfunctions. There is a pressing need for integrative, evidence-based adjuncts that

address *Agni* imbalance, lipid dysregulation, and oxidative stress while ensuring safety and tolerability. Hence, this study aims to evaluate the clinical efficacy and safety of Mustadikwathghana Vati in the management of Type 2 Diabetes Mellitus as an adjunct to standard therapy.

MATERIAL AND METHODS

Study Design: Single-case, open-label, pre-post observational clinical study with institutional ethical clearance (IEC/AYU/2025/07) and informed consent.

Patient Profile: A 52-year-old male with T2DM for two years presented with polyuria, polydipsia, fatigue, and mild obesity (BMI 27.8 kg/m²). Baseline investigations: FBS 210 mg/dL, PPBS 320 mg/dL, HbA1c 8.9%.

Intervention: Drug: Mustadikwathghana Vati (standardized, GMP-certified; 500 mg twice daily before meals with warm water)

- Duration: 90 days
- Diet: *Yava* (barley), *Mudga* (green gram), *Kulattha* (horse gram), *Karavellaka* (bitter gourd), *Takra* (buttermilk); avoidance of sugar, refined flour, and fried foods^[24]
- Lifestyle: Daily brisk walking (45 min), *Pranayama*, and avoidance of *Divaswapna* (daytime sleep)

Outcome Measures:

- Subjective: *Prabhuta Mutrata*, *Pipasa*, *Daurbalya*, *Kshudha* (graded 0–3 scale)
 - Objective: FBS, PPBS, HbA1c, lipid profile, BMI
 - Safety: Liver and renal function tests
- Assessment: Baseline, 30, 60, and 90 days.

RESULTS AND OBSERVATIONS:

Findings

After 90 days, significant clinical and biochemical improvement was recorded:

Parameter	Baseline	Day 90	% Change
FBS (mg/dL)	210	124	↓41%
PPBS (mg/dL)	320	172	↓46%
HbA1c (%)	8.9	6.8	↓23%
Triglycerides (mg/dL)	190	150	↓21%
HDL (mg/dL)	38	45	↑18%
BMI (kg/m ²)	27.8	26.3	↓5%

Subjective symptoms such as *Prabhuta Mutrata* and *Pipasa* improved by ~80%, and *Daurbalya* by ~70%. Liver and kidney functions remained normal, confirming safety.

DISCUSSION

From an Ayurvedic standpoint, *Prameha* arises due to *Kapha-Meda Vriddhi* and *Agnimandya*, leading to *Kleda* accumulation [25]. Mustadikwathghana Vati, through *Deepana-Pachana* actions, rekindles *Agni*, removes *Ama*, and clears *Srotorodha* (obstruction of channels). The *Tikta-Kashaya Rasa* and *Laghu-Ruksha*

Guna of *Musta* counteract *Kapha* and *Meda* dosha, thereby normalizing metabolic processes [26,27].

From a modern perspective, *Cyperus rotundus* and *Curcuma longa* modulate glucose metabolism through multiple mechanisms:

- PPAR- γ activation improving insulin sensitivity [28]
- α -glucosidase and α -amylase inhibition reducing postprandial spikes [29]

- Protection against oxidative β -cell damage [30]
- Modulation of lipid homeostasis via HMG-CoA reductase pathways [31]

These molecular pathways align with Ayurvedic principles of Agni Dipti and Meda Shoshana. Lifestyle modification—exercise, yoga, and mindful diet—amplified these benefits by reducing insulin resistance and stress-induced hyperglycemia [32–34].

Thus, Mustadikwathghana Vati represents a systems therapeutic model, integrating molecular pharmacology with Ayurvedic physiology. Compared to monotherapy, its multidimensional approach ensures sustained glycaemic balance, metabolic correction, and safety [35–36].

CONCLUSION

Mustadikwathghana Vati significantly improved glycaemic control, lipid metabolism, and subjective well-being in a Type 2 Diabetes Mellitus case without adverse reactions. The formulation's Deepana-Pachana, Kaphahara, and Medohara actions correspond to enhanced insulin sensitivity and antioxidant modulation. This integrative outcome underscores the therapeutic relevance of Ayurvedic formulations in chronic metabolic disorders. Large-scale, controlled clinical trials are warranted to validate these findings and explore biomolecular correlations.

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