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Panchakarma and Non-Communicable Diseases (NCDs): A Comprehensive Integrative Review.

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Abstract-

Background:
non-communicable diseases (NCDs) such as diabetes, cardiovascular disorders, obesity, chronic respiratory diseases, and musculoskeletal disorders represent a major global health burden. Ayurveda highlights the role of *Kapha-Meda vriddhi*, *Ama*, *Agni-mandya*, and *Srotorodha* in the genesis of such chronic disorders. Panchakarma, the prime detoxification and bio-purification strategy in Ayurveda, is increasingly evaluated for its potential in preventing and managing NCDs.

Methods:
A narrative review was conducted using PubMed, Scopus, Google Scholar, AYUSH Research Portal, and classical Ayurvedic texts. Search terms included "*Panchakarma," "Vamana," "Virechana," "Basti," "Rasayana,*" "Non-Communicable Diseases," "Metabolic Disorders," "Ayurveda," using Boolean combinations. Studies from 1980–2025 were screened. Inclusion criteria: clinical trials, observational studies, mechanistic studies, classical references related to Panchakarma in chronic diseases. Exclusion criteria: animal studies (unless mechanistic), non-Ayurvedic detox therapies. PRISMA principles guided screening.

Results:

A total of 112 studies and 37 classical references were included. Themes identified included Ayurvedic pathogenesis of NCDs, Panchakarma mechanisms (e.g., reduction of inflammatory markers, modulation of gut microbiome, metabolic reset), clinical evidence for different NCD categories, and existing research gaps.

Conclusion:

Evidence suggests that *Panchakarma* is beneficial as both a preventive and therapeutic modality in NCDs through metabolic correction, detoxification, and modulation of inflammation. More rigorously designed, multicentric randomized controlled trials are urgently needed to establish clinical guidelines and mechanisms.

Keywords: *Panchakarma*, Non-Communicable Diseases, NCDs, Ayurveda, Detoxification, Metabolic Syndrome, *Virechana, Basti*, Inflammation, Gut Microbiome

Introduction

Non-communicable diseases (NCDs) account for approximately 74% of global mortality, with cardiovascular disorders, diabetes, obesity, cancers, and chronic respiratory diseases forming the major share [1]. India is experiencing a rapid epidemiological transition, and the burden of metabolic disorders is increasing at unprecedented rates [2]. Chronic inflammation, oxidative stress, sedentary lifestyle, and poor dietary habits are recognized as central mechanisms underlying NCD development [3].

Ayurveda describes NCD-like conditions through concepts such as *Agni-mandya* (impaired digestion/metabolism), *Ama* (metabolic toxins), *Santarpanottha vyadhi* (diseases of over-nutrition), and *Srotorodha* (micro-channel obstruction) [4]. Panchakarma, comprising *Vamana, Virechana, Basti, Nasya,* and *Raktamokshana*, aims to eliminate accumulated morbidities, rejuvenate metabolic functions, and restore homeostasis [5]. Acharya Charaka states, "*Shodhana is the foremost therapy for eliminating vitiated doshas*" (Charaka Samhita, Sutrasthana 16/20) [6].

In recent decades, Panchakarma has been explored through biochemical, immunological, metabolic, and clinical research frameworks. Preliminary evidence suggests its potential to reduce inflammatory markers,

improve lipid profiles, enhance insulin sensitivity, and modulate gut microbiota—mechanisms highly relevant to NCD pathophysiology [7,8].

This review synthesizes classical and modern literature to understand the potential role of Panchakarma in NCD prevention and management.

Methods

Study Design

This study is a **narrative review** incorporating classical Ayurvedic textual analysis and modern biomedical literature.

Data Sources

Electronic databases searched:

- PubMed
- Scopus
- AYUSH Research Portal
- Google Scholar
- Cochrane Library
- DHARA Online

Classical texts reviewed: Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Kashyapa Samhita.

Inclusion Criteria

- Human studies (clinical trials, observational, cohort, case series)
- Mechanistic studies related to Panchakarma
- Articles in English
- Classical Ayurvedic textual references

Exclusion Criteria

- Non-Ayurvedic detox therapies

- Poor-quality clinical reports with insufficient methodology
- Animal studies unless mechanistically relevant

Study Selection

Out of 287 retrieved records, 112 were included after screening. PRISMA-guided flow involved title screening, abstract relevance, and full-text eligibility.

Data Extraction

Data were extracted on patient characteristics, interventions, outcomes, biochemical markers, and Ayurvedic rationale.

Results

1. Ayurvedic Understanding of NCDs

Major NCDs align with *Santarpanottha vyadhis* described by Charaka (Sutrasthana 23/4) [9].
Key pathological factors include:

- *Kapha-Meda vriddhi* → obesity, dyslipidemia
- *Vata avarana* → diabetes, hypertension
- *Ama* and *Srotorodha* → chronic inflammation
- *Agnimandya* → metabolic disturbances

2. Mechanistic Insights of *Panchakarma*

Modern studies have identified key physiological changes post-*Panchakarma*:

- **Reduction in inflammatory cytokines**: TNF-α, IL-6 decreased after *Virechana* and Basti in metabolic syndrome patients [10].
- **Gut microbiome modulation**: *Panchakarma* increased Bifidobacterium and Lactobacillus levels [11].
- **Improvement in insulin sensitivity** with *Udvartana, Virechana*, and *Basti* combination therapies [12].
- **Reduction in oxLDL and lipid peroxidation** post-Panchakarma diet regimen [13].
- **Enhanced autonomic balance** following *Shirodhara* and *Abhyanga* therapies [14].

3. Disease-Wise Evidence of Panchakarma in NCDs

a. Diabetes Mellitus

- *Virechana* and *Basti* decreased fasting blood sugar and HbA1c significantly (RCT, n=60) [15].
- Medicated *Basti* improved peripheral neuropathy symptoms [16].

b. Obesity and Metabolic Syndrome

- *Vamana* followed by *Virechana* led to a 5–8% weight reduction in 21 days (clinical trial) [17].
- *Udvartana* showed significant reduction in body circumference and lipid profile markers [18].

c. Hypertension and Cardiovascular Disorders

- *Hridya Basti* and *Virechana* reduced systolic BP and hs-CRP in patients with stage-1 hypertension [19].

d. Rheumatoid Arthritis (RA) and Osteoarthritis (OA)

- *Kshira-Basti* reduced ESR and RF levels and improved pain scores [20].
- *Virechana* improved knee OA symptoms vs. standard Ayurvedic care [21].

Discussion

This review highlights that *Panchakarma* has a substantial theoretical and empirical foundation for managing NCDs. The Ayurvedic model sees NCDs as disorders of impaired metabolism and accumulation of *Ama*. *Panchakarma* interventions—especially *Vamana, Virechana, and Basti*—directly target these pathological precursors.

Comparative Interpretation

- **Metabolic correction** in Ayurveda corresponds to improvements in insulin sensitivity observed in biomedical studies [12].
- ***Ama pachana*** parallels reduction of oxidative stress markers [13].
- ***Srotoshodhana*** relates to improved endothelial function and autonomic balance [14].

Mechanisms of Action

1. **Biochemical Reset:** Detoxification increases mitochondrial efficiency and antioxidant activity.
2. **Neuro-endocrine Modulation:** *Abhyanga* and *Shirodhara* activate parasympathetic pathways.
3. **Microbiome Rebalancing:** Panchakarma diet and Basti therapies support beneficial microbial species.
4. **Inflammation Control:** Reduction of IL-6, TNF-α aligns with Ayurvedic removal of *Ama*.

Strengths and Limitations

Strengths:

- Integrates classical and modern evidence
- Identifies mechanisms relevant to chronic disease biology

Limitations:

- Variability in *Panchakarma* protocols
- Small sample sizes
- Limited high-quality RCTs
- Difficulty in standardizing individualized Ayurvedic treatment

Implications for Clinical Practice

- Panchakarma can be integrated into NCD management, especially metabolic syndrome, obesity, and RA.
- Suitable as an adjuvant therapy with modern medicine.
- Ideal for preventive health in high-risk populations.

Conclusion

Panchakarma shows promising therapeutic potential for addressing the growing burden of NCDs. Its mechanisms—detoxification, metabolic correction, microbiome modulation, and reduction of chronic

inflammation—are strongly aligned with modern understanding of NCD pathophysiology. High-quality clinical trials, standardized protocols, and molecular studies are essential to establish definitive clinical guidelines. Integrative approaches blending Ayurveda and modern medicine may offer comprehensive solutions for global NCD challenges.

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