Review Article

Lekhaniya Mahakashaya in the Management of Lifestyle Disorders: A Critical Review

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ABSTRACT

Background: Lifestyle disorders including obesity, dyslipidemia, and metabolic syndrome represent a growing global health challenge. *Lekhaniya Mahakashaya*, a classical Ayurvedic formulation comprising ten medicinal herbs, has been traditionally employed for managing disorders of fat metabolism (*Medodushti*) through its unique *Lekhana Karma* (scraping action).

Objective: This critical review examines the concept of *Lekhana Karma*, evaluates the pharmacological profiles of the ten constituent drugs (*Musta, Kushtha, Haridra, Daruharidra, Vacha, Ativisha, Katurohini, Chitraka, Chirabilva, and Haimavati*), and synthesizes clinical evidence for their efficacy in obesity, dyslipidemia, and metabolic syndrome. **Methods:** A comprehensive review of classical Ayurvedic texts, contemporary clinical trials, and pharmacological studies was conducted to evaluate the therapeutic potential of *Lekhaniya Mahakashaya* in lifestyle disorders. **Results:** The constituent drugs predominantly possess *Tikta* (bitter), *Katu* (pungent), and *Kashaya* (astringent) *Rasa*; *Laghu* (light), *Ruksha* (dry), and *Tikshna* (sharp) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* (pungent post-digestive effect). Clinical studies demonstrate significant improvements in body mass index, lipid profiles, oxidative stress markers, and metabolic parameters. The formulation exhibits *Medohara* (lipolytic), *Deepana* (appetizer), *Pachana* (digestive), and *Srotoshodhana* (channel-cleansing) properties. **Conclusion:** *Lekhaniya Mahakashaya* represents a promising therapeutic approach for lifestyle disorders through its multi-targeted pharmacological actions. However, larger randomized controlled trials with standardized formulations are needed to establish definitive clinical efficacy and safety profiles.

Key words: *Lekhaniya Mahakashaya, Lekhana Karma*, Obesity, Dyslipidemia, Metabolic Syndrome, *Medoroga*, Lifestyle Disorders

1. INTRODUCTION

The cotemporary world faces an unprecedented epidemic of lifestyle disorders, with obesity, dyslipidemia, and metabolic syndrome emerging as leading causes of cardiovascular morbidity and mortality. According to the World Health Organization, cardiovascular diseases remain the leading cause of death globally, claiming an estimated 17.9 million lives annually, with dyslipidemia serving as a major modifiable risk factor [1]. The prevalence of metabolic syndrome has reached alarming proportions, affecting approximately 20-25% of the global adult population and directly influencing the risk of type 2 diabetes mellitus and atherosclerotic cardiovascular disease [2].

Modern pharmacotherapy for these conditions, while effective, is often associated with adverse effects, high costs, and the need for lifelong medication. Statins, the cornerstone of dyslipidemia management, can cause myopathy, hepatotoxicity, and new-onset diabetes [3]. This therapeutic gap has prompted renewed interest in traditional medicine systems, particularly Ayurveda, which offers time-tested formulations with potentially fewer side effects.

In Ayurvedic nosology, obesity is termed *Sthaulya or Medoroga*, characterized by excessive accumulation of *Meda Dhatu* (adipose tissue) along with vitiated *Kapha Dosha*. *Acharya Charaka*, in his seminal text *Charaka Samhita*, describes *Sthaulya* as bulkiness of the body due to extensive growth in the abdominal region, resulting from abnormal excessive *Medodhatu* accumulation [4]. The management of such *Santarpanottha Vikaras* (diseases due to excessive nutrition) requires drugs possessing *Lekhana* (scraping), *Medohara* (fat-reducing), and *Srotoshodhana* (channel-cleansing) properties.

Lekhaniya Mahakashaya, one of the fifty *Mahakashaya* groups enumerated by *Charaka*, comprises ten medicinal plants specifically indicated for the management of disorders arising from excessive fat accumulation. The formulation includes *Musta (Cyperus rotundus), Kushtha (Saussurea lappa), Haridra (Curcuma longa), Daruharidra (Berberis aristata), Vacha (Acorus calamus), Ativisha (Aconitum heterophyllum), Katurohini (Picrorhiza kurroa), Chitraka (Plumbago zeylanica), Chirabilva (Holoptelea integrifolia)* and *Haimavati (Iris germanica)* [5]. These drugs act synergistically through their unique pharmacodynamic properties to address the pathophysiology of lifestyle disorders.

This critical review aims to elucidate the concept of *Lekhana Karma*, examine the pharmacological profiles of the ten constituent

drugs based on their *Rasa Panchaka* (five fundamental properties), and evaluate the clinical evidence supporting the use of *Lekhaniya Mahakashaya* in obesity, dyslipidemia, and metabolic syndrome.

2. CONCEPT OF *LEKHANA KARMA*

2.1 Theoretical Foundation

Lekhana Karma represents a fundamental therapeutic principle in Ayurveda, literally meaning "scraping action." This concept is rooted in the understanding that certain diseases, particularly those arising from *Santarpana* (over-nourishment), require drugs that can scrape away or reduce excessive accumulation of *Dhatus* (tissues), especially *Meda* (fat) and *Kapha* [6]. The *Lekhana* action is distinct from mere weight reduction; it specifically targets pathological accumulation while preserving physiological tissue integrity.

Acharya Charaka emphasizes that drugs possessing *Lekhana* properties should have specific *Rasa Panchaka* attributes. According to classical texts, substances with *Tikta* (bitter), *Katu* (pungent), and *Kashaya* (astringent) *Rasa*; *Laghu* (light), *Ruksha* (dry), and *Tikshna* (sharp) *Guna; Ushna Virya* (hot potency); and *Katu Vipaka* (pungent post-digestive effect) are most effective in performing *Lekhana Karma* [1]. These properties work synergistically to counteract the *Guru* (heavy), *Snigdha* (unctuous), *Manda* (slow), and *Picchila* (slimy) qualities of vitiated *Kapha* and excessive *Meda Dhatu*.

2.2 Mechanism of Action

The mechanism of *Lekhana Karma* can be understood through multiple dimensions. At the *Dosha* level, the *Ruksha* (dry) and *Tikshna* (sharp) qualities oppose the *Snigdha* (unctuous) nature of *Kapha* and *Meda*, thereby reducing their pathological accumulation. The *Ushna Virya* (hot potency) enhances *Agni* (digestive fire), preventing the formation of *Ama* (metabolic toxins) and promoting proper metabolism of nutrients [7].

At the *Dhatu* level, *Lekhana* drugs prevent excessive nourishment of *Meda Dhatu* while promoting its proper metabolism. The *Katu Vipaka* (pungent post-digestive effect) is particularly significant, as it produces *Medohara* (fat-reducing), *Lekhana* (scraping), and *Karshana* (emaciation) effects, which are essential for managing obesity and related disorders [1]. This action is not merely catabolic but involves restoration of normal *Meda Dhatu* metabolism.

At the *Srotas* (channel) level, *Lekhana* drugs perform *Srotoshodhana* (channel cleansing), removing accumulated *Ama* and *Mala* (waste products) from *Medovaha Srotas* (fat-carrying channels). This cleansing action improves nutrient delivery, waste removal, and overall tissue metabolism [8]. The *Tikshna Guna*

(sharp quality) enables these drugs to penetrate deep tissues and mobilize stubborn fat deposits.

2.3 Clinical Implications

The concept of *Lekhana Karma* has profound clinical implications for managing lifestyle disorders. Unlike modern weight-loss drugs that often work through single mechanisms (appetite suppression, fat absorption inhibition, or thermogenesis), *Lekhana* drugs address multiple pathophysiological aspects simultaneously. They enhance digestive capacity (*Deepana-Pachana*), improve fat metabolism (*Medohara*), cleanse channels (*Srotoshodhana*), and restore normal *Dosha* balance (*Dosha Shamana*) [9].

Furthermore, *Lekhana Karma* is not limited to weight reduction but extends to improving overall metabolic health. By addressing the root cause of *Medodushti* (fat metabolism disorders), these drugs potentially prevent or ameliorate associated complications such as dyslipidemia, insulin resistance, hypertension, and cardiovascular disease [2]. This holistic approach aligns with the modern understanding of metabolic syndrome as a cluster of interconnected metabolic abnormalities requiring multi-targeted therapy.

3. PHARMACOLOGICAL PROFILES OF THE TEN CONSTITUENT DRUGS

3.1 *Musta (Cyperus rotundus* Linn.)

Musta, commonly known as nut grass, is a perennial herb widely distributed across tropical and subtropical regions. Its rhizomes are the medicinally active part, possessing *Tikta* (bitter), *Katu* (pungent), and *Kashaya* (astringent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Sheeta Virya* (cold potency); and *Katu Vipaka* [10]. Despite its *Sheeta Virya*, *Musta* is included in *Lekhaniya Mahakashaya* due to its potent *Deepana* (appetizer), *Pachana* (digestive), and *Medohara* (fat-reducing) properties.

Phytochemically, *Musta* rhizomes contain flavonoids, ascorbic acid, polyphenols, sesquiterpenes (α-cyperone, cyperotundone), and essential oils. These compounds contribute to its antioxidant, anti-inflammatory, and lipid-lowering activities [11]. Clinical studies have demonstrated that *Musta* significantly reduces oxidative stress markers (malondialdehyde) while increasing antioxidant enzyme levels (glutathione) in obese patients. A 90-day clinical trial showed that *Musta churna* (3 grams thrice daily) combined with diet and exercise produced significant improvements in body mass index, waist-hip ratio, and oxidative stress parameters compared to diet and exercise alone [11].

The anti-obesity mechanism of *Musta* involves multiple pathways: enhancement of lipid metabolism through increased lipolysis, reduction of lipogenesis, improvement of insulin sensitivity, and attenuation of oxidative

stress-induced adipocyte dysfunction [12]. Its *Deepana-Pachana* properties improve digestive fire, preventing *Ama* formation and subsequent *Medodushti*.

3.2 *Kushtha (Saussurea lappa* Clarke)

Kushtha, also known as costus root, is a highly valued herb in Ayurvedic medicine. It possesses *Tikta* (bitter) and *Katu* (pungent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [5]. These properties make it an ideal component of *Lekhaniya Mahakashaya*, as it strongly opposes *Kapha* and *Meda* accumulation.

The root contains sesquiterpene lactones (costunolide, dehydrocostus lactone), essential oils, and alkaloids. These compounds exhibit anti-inflammatory, antioxidant, and metabolic-modulating activities. *Kushtha* enhances digestive enzyme secretion, improves fat metabolism, and possesses hepatoprotective properties that support liver function in lipid metabolism [13]. Its *Tikshna* (sharp) and *Ushna* (hot) qualities enable deep tissue penetration and mobilization of stubborn fat deposits.

3.3 *Haridra (Curcuma longa* Linn.)

Haridra, commonly known as turmeric, is one of the most extensively researched Ayurvedic herbs. It possesses *Tikta* (bitter) and *Katu* (pungent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [14]. Its primary active constituent, curcumin, along with other curcuminoids, exhibits potent anti-inflammatory, antioxidant, and metabolic-modulating properties.

Haridra's role in managing lifestyle disorders is multifaceted. Curcumin inhibits adipogenesis by downregulating adipogenic transcription factors (PPARγ, C/EBPα), reduces inflammation by suppressing NF-κB activation, improves insulin sensitivity, and exhibits hypolipidemic effects by inhibiting cholesterol synthesis and enhancing bile acid excretion [15]. Clinical studies have demonstrated that curcumin supplementation significantly reduces body mass index, waist circumference, triglycerides, and LDL cholesterol while increasing HDL cholesterol in patients with metabolic syndrome [16].

The *Lekhana* action of *Haridra* is attributed to its *Ruksha* (dry) and *Tikshna* (sharp) qualities, which counteract the *Snigdha* (unctuous) nature of excessive *Meda*. Its *Ushna Virya* enhances *Agni*, promoting proper digestion and metabolism. Additionally, *Haridra* possesses *Varnya* (complexion-enhancing) and *Kushthagna* (anti-dermatological) properties, addressing skin manifestations often associated with obesity and metabolic disorders.

3.4 *Daruharidra (Berberis aristata* DC.)

Daruharidra, also known as Indian barberry, is a shrub whose stem and root bark are used medicinally. It possesses *Tikta* (bitter) and *Kashaya* (astringent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [5]. The primary alkaloid, berberine, is responsible for most of its pharmacological activities.

Berberine has emerged as a promising natural compound for metabolic disorders. It activates AMP-activated protein kinase (AMPK), a master regulator of cellular energy metabolism, leading to increased glucose uptake, enhanced fatty acid oxidation, and reduced lipogenesis [17]. Clinical trials have shown that berberine (500 mg three times daily) produces effects comparable to metformin in improving glycemic control and lipid profiles in patients with type 2 diabetes and metabolic syndrome [18].

Daruharidra's Lekhana action is mediated through its *Tikshna* (sharp) and *Ushna* (hot) properties, which penetrate tissues and mobilize accumulated fat. Its *Kashaya Rasa* provides astringent action, toning tissues and preventing excessive secretions. The herb also exhibits hepatoprotective and anti-inflammatory properties, supporting overall metabolic health [19].

3.5 *Vacha (Acorus calamus* Linn.)

Vacha, commonly known as sweet flag, is a semi-aquatic perennial herb whose rhizome is used medicinally. It possesses *Katu* (pungent) and *Tikta* (bitter) *Rasa*; *Laghu* (light) and *Tikshna* (sharp) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [20]. *Vacha* is particularly renowned for its *Medhya* (nootropic) properties but also plays a significant role in *Lekhana Karma*.

The rhizome contains β-asarone, α-asarone, and other volatile oils that exhibit neuroprotective, anti-inflammatory, and metabolic-modulating activities. *Vacha* enhances digestive enzyme secretion, improves fat metabolism, and possesses carminative properties that reduce bloating and discomfort associated with obesity [21]. Its *Tikshna Guna* enables penetration into subtle channels, clearing obstructions and improving nutrient delivery.

In the context of lifestyle disorders, *Vacha* addresses the psychological aspects of obesity, including stress-induced eating and cognitive dysfunction associated with metabolic syndrome. Its *Medhya* properties improve mental clarity, decision-making, and adherence to lifestyle modifications [20]. The *Katu Vipaka* produces *Medohara* effects, directly reducing fat accumulation.

3.6 *Ativisha (Aconitum heterophyllum* Wall.)

Ativisha, also known as Indian atees, is a perennial herb whose tuberous roots are used medicinally after proper purification (*Shodhana*). It possesses *Tikta* (bitter) and

Kashaya (astringent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [5]. Unlike its toxic relative *Visha* (Aconitum ferox), *Ativisha* is safe when properly processed.

Ativisha contains alkaloids (atisine, heteratisine), flavonoids, and tannins. It exhibits anti-inflammatory, immunomodulatory, and metabolic-regulating properties. The herb is particularly effective in improving digestive function, reducing *Ama* formation, and enhancing nutrient assimilation [22]. Its *Deepana-Pachana* properties make it valuable in managing the digestive dysfunction often associated with obesity and metabolic disorders.

The *Lekhana* action of *Ativisha* is mediated through its *Ruksha* (dry) and *Tikshna* (sharp) qualities, which oppose *Kapha* and *Meda* accumulation. Its *Tikta Rasa* provides detoxifying effects, supporting liver function and elimination of metabolic waste products. Clinical observations suggest that *Ativisha* improves appetite regulation, preventing both excessive hunger and loss of appetite [23].

3.7 *Katurohini (Picrorhiza kurroa Royle* ex Benth.)

Katurohini, also known as *Kutaki*, is a small perennial herb found in the Himalayan region. Its rhizome and roots are used medicinally. It possesses *Tikta* (bitter) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Sheeta Virya* (cold potency); and *Katu Vipaka* [24]. Despite its *Sheeta Virya, Katurohini* is included in *Lekhaniya Mahakashaya* due to its potent hepatoprotective and *Medohara* properties.

The primary active constituents are iridoid glycosides (picroside I, picroside II, kutkoside) and cucurbitacins. These compounds exhibit potent hepatoprotective, anti-inflammatory, antioxidant, and immunomodulatory activities [25]. *Katurohini* is particularly valuable in managing non-alcoholic fatty liver disease (NAFLD), a common complication of obesity and metabolic syndrome. It enhances bile secretion, improves fat digestion, and protects hepatocytes from oxidative damage.

Clinical studies have demonstrated that *Kutaki*, in combination with other herbs, significantly improves liver function tests, lipid profiles, and body weight in obese patients [26]. Its *Tikta Rasa* provides strong *Medohara* effects, while its hepatoprotective properties ensure safe and effective fat metabolism. The *Katu Vipaka* produces *Lekhana* and *Karshana* effects, directly addressing excessive fat accumulation.

3.8 *Chitraka (Plumbago zeylanica* Linn.)

Chitraka, commonly known as leadwort, is a perennial herb whose root is used medicinally. It possesses *Katu* (pungent) *Rasa*; *Laghu* (light), *Ruksha* (dry), and *Tikshna* (sharp) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [27]. *Chitraka* is renowned as one of

the most potent *Deepana-Pachana* drugs in Ayurveda.

The root contains plumbagin, a naphthoquinone compound responsible for most of its pharmacological activities. Plumbagin exhibits anti-inflammatory, antioxidant, anti-obesity, and metabolic-modulating properties [28]. It enhances digestive enzyme secretion, improves gastric motility, and increases basal metabolic rate, thereby promoting weight loss.

Chitraka's Lekhana action is particularly strong due to its *Tikshna* (sharp) and *Ushna* (hot) qualities. It penetrates deep tissues, mobilizes stubborn fat deposits, and improves circulation. The herb also exhibits thermogenic properties, increasing energy expenditure and fat oxidation [29]. However, due to its potent *Ushna Virya*, *Chitraka* should be used cautiously in patients with *Pitta*-predominant conditions.

3.9 *Chirabilva (Holoptelea integrifolia* Roxb.)

Chirabilva, also known as Indian elm, is a deciduous tree whose bark is used medicinally. It possesses *Tikta* (bitter) and *Kashaya* (astringent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna*; *Ushna Virya* (hot potency); and *Katu Vipaka* [5]. The bark contains tannins, flavonoids, and triterpenoids that contribute to its therapeutic properties.

Chirabilva exhibits anti-inflammatory, antioxidant, and wound-healing properties. In the context of Lekhana Karma, it provides astringent action that tones tissues and prevents excessive secretions. Its Tikta Rasa supports liver function and detoxification, while its Ruksha Guna opposes the Snigdha nature of excessive Meda [30]. The herb also possesses antimicrobial properties, addressing gut dysbiosis that may contribute to obesity and metabolic disorders.

3.10 *Haimavati (Iris germanica* Linn.)

Haimavati, also known as German iris, is a perennial herb whose rhizome is used medicinally. It possesses *Tikta* (bitter) and *Katu* (pungent) *Rasa*; *Laghu* (light) and *Ruksha* (dry) *Guna; Ushna Virya* (hot potency); and *Katu Vipaka* [5]. The rhizome contains iridals, flavonoids, and essential oils.

Haimavati exhibits anti-inflammatory, antioxidant, and metabolic-modulating properties. Its *Lekhana* action is mediated through its *Ruksha* (dry) and *Tikshna* (sharp) qualities, which oppose *Kapha* and *Meda* accumulation. The herb improves digestive function, enhances fat metabolism, and possesses diuretic properties that reduce water retention often associated with obesity [31]. Its *Katu Vipaka* produces *Medohara* effects, directly addressing excessive fat accumulation.

4. CLINICAL EVIDENCE IN LIFESTYLE DISORDERS

4.1 Obesity (*Sthaulya*)

Obesity, characterized by excessive accumulation of body fat, is a major risk factor for numerous chronic diseases. In Ayurveda, it is termed *Sthaulya or Medoroga* and is considered one of the eight undesirable conditions (*Ashtau Nindita Purusha*). Several clinical studies have evaluated the efficacy of *Lekhaniya Mahakashaya* and its constituent drugs in managing obesity.

A clinical trial evaluating *Mustachurna* (a key component of *Lekhaniya Mahakashaya*) in 60 obese patients demonstrated significant improvements in anthropometric parameters and oxidative stress markers. Patients receiving *Mustachurna* (3 grams thrice daily) along with diet and exercise showed greater reductions in body mass index, waist-hip ratio, and malondialdehyde levels compared to those receiving diet and exercise alone [11]. The study also reported improvements in glutathione levels, indicating enhanced antioxidant defense.

A randomized clinical trial comparing *Lekhaniya Kashaya Vasti* (medicated enema) and *Lekhaniya Ghana Vati* (tablet form) in obese patients found both interventions effective in reducing body weight, body mass index, and waist circumference [32]. The study emphasized the importance of diet and lifestyle modifications as adjuncts to herbal therapy, consistent with Ayurvedic principles of *Nidana Parivarjana* (avoidance of causative factors).

A fundamental study on the effect of *Lekhaniya Mahakashaya* in *Santarpanjanya Vyadhi* (diseases due to over-nutrition) with reference to obesity reported significant improvements in subjective symptoms such as excessive thirst, excessive hunger, excessive sweating, and breathlessness [33]. The study attributed these benefits to the formulation's *Deepana-Pachana*, *Medohara*, and *Srotoshodhana* properties.

4.2 Dyslipidemia (*Medodushti*)

Dyslipidemia, characterized by abnormal lipid levels in the blood, is a major risk factor for cardiovascular disease. It includes elevated total cholesterol, LDL cholesterol, triglycerides, and reduced HDL cholesterol. In Ayurveda, dyslipidemia is understood as *Medodushti* (vitiation of fat tissue) and is managed through *Lekhana* drugs.

A prospective clinical study evaluating *Lekhaniya Mahakashaya Ghana Vati* in 40 patients with dyslipidemia reported encouraging results. After 50 days of treatment, 12.5% of patients achieved complete relief, 42.5% showed marked improvement, and 42.5% demonstrated moderate improvement in signs and symptoms [34]. The study reported significant reductions in total cholesterol, LDL cholesterol, and triglycerides, along with improvements in HDL cholesterol.

A comparative study of *Lekhaniya Mahakashaya Ghana Vati* and *Mustadi Ghana Vati* in dyslipidemia patients found both formulations effective in improving lipid profiles [35]. The study attributed the hypolipidemic effects to the *Laghu* (light), *Tikshna* (sharp), and *Katu* (pungent) properties of the constituent drugs, which enhance fat metabolism and reduce pathological fat accumulation.

A clinical study evaluating the effect of *Lekhaniya Mahakashaya* on lipid profile reported significant reductions in total cholesterol, LDL cholesterol, VLDL cholesterol, and triglycerides, along with increases in HDL cholesterol [36]. The study concluded that the formulation's hypolipidemic effect is consistent with its classical pharmacodynamic properties described in Ayurvedic texts.

Importantly, these clinical studies reported no significant adverse effects, suggesting that *Lekhaniya Mahakashaya* is safe and well-tolerated. This is a significant advantage over conventional lipid-lowering drugs, which are often associated with myopathy, hepatotoxicity, and other side effects [3].

4.3 Metabolic Syndrome (*Medoroga*)

Metabolic syndrome is a cluster of conditions including abdominal obesity, insulin resistance, dyslipidemia, and hypertension that collectively increase the risk of cardiovascular disease and type 2 diabetes. In Ayurveda, this condition aligns closely with the concept of *Medoroga*, where vitiated *Meda Dhatu* affects multiple body systems.

A comparative clinical trial evaluated *Phalatrikadi Yoga Ghana Vati* combined with Lekhaniya *Mahakashaya Kwatha* versus metformin in 90 patients with metabolic syndrome [37]. After three months of treatment, the Ayurvedic combination produced significant improvements in subjective parameters, lipid profile, body mass index, body weight, waist circumference, blood pressure, and glycemic parameters. The study reported that the Ayurvedic intervention was more effective than metformin and was well-tolerated without significant adverse effects.

A review study on the therapeutic appraisal of *Phalatrikadi Yoga* with *Lekhaniya Mahakashaya* in *Medoroga* with reference to metabolic syndrome emphasized the importance of pharmacodynamic attributes in drug selection [1]. The review highlighted that drugs with *Tikta, Katu*, and *Kashaya Rasa*; *Laghu, Ruksha*, and *Tikshna Guna; Ushna Virya*; and *Katu Vipaka* are most effective in managing metabolic syndrome. These properties produce *Medohara, Lekhana, Karshana, Deepana, Pachana,* and *Srotoshodhana* effects, addressing multiple pathophysiological aspects of metabolic syndrome simultaneously.

A clinical study evaluating *Lekhaniya Mahakashaya* in *Medavriddhi* (hyperlipidemia) reported significant improvements in lipid parameters, body weight, and subjective symptoms [38]. The study emphasized that *Lekhaniya Mahakashaya* addresses not only lipid abnormalities but also associated symptoms such as excessive thirst, hunger, sweating, and fatigue, thereby improving overall quality of life.

4.4 Safety and Tolerability

An important aspect of clinical evidence is the safety profile of *Lekhaniya Mahakashaya*. Multiple clinical studies have reported that the formulation is well-tolerated with minimal or no adverse effects [34], [37], [38]. This is consistent with the Ayurvedic principle that properly formulated herbal combinations, when used in appropriate doses and with proper adjuvants (*Anupana*), are safe and effective.

However, it is important to note that some constituent drugs, particularly *Chitraka* and *Vacha*, possess potent *Ushna Virya* and should be used cautiously in patients with *Pitta*-predominant conditions or those prone to gastric irritation. Additionally, *Ativisha* requires proper purification (*Shodhana*) before use to ensure safety. These considerations underscore the importance of proper formulation, standardization, and administration under qualified supervision.

5. DISCUSSION

5.1 Integration of Classical and Contemporary Understanding

The clinical evidence supporting *Lekhaniya Mahakashaya* in lifestyle disorders demonstrates a remarkable convergence between classical Ayurvedic principles and modern scientific understanding. The *Lekhana* Karma concept, rooted in ancient wisdom, aligns with contemporary knowledge of adipocyte biology, lipid metabolism, and metabolic regulation.

The pharmacodynamic properties described in Ayurvedic texts—*Tikta, Katu*, and *Kashaya Rasa; Laghu, Ruksha,* and *Tikshna Guna*; *Ushna Virya*; and *Katu Vipaka*—correlate with specific biochemical mechanisms. For instance, the *Tikta Rasa* (bitter taste) is often associated with alkaloids and glycosides that modulate metabolic pathways, enhance insulin sensitivity, and reduce inflammation [39]. The *Katu Rasa* (pungent taste) is linked to compounds like piperine, gingerol, and capsaicin that increase thermogenesis, enhance fat oxidation, and improve digestive enzyme secretion [40].

The *Ruksha Guna* (dry quality) opposes the *Snigdha* (unctuous) nature of excessive fat, potentially through mechanisms involving

reduced lipogenesis, enhanced lipolysis, and improved fat mobilization. The *Tikshna Guna* (sharp quality) enables deep tissue penetration, possibly through enhanced bioavailability, improved circulation, and increased cellular uptake of active compounds [41].

5.2 Multi-Targeted Therapeutic Approach

One of the key advantages of *Lekhaniya Mahakashaya* over single-drug modern therapies is its multi-targeted approach. Lifestyle disorders, particularly metabolic syndrome, involve complex interactions between genetic, environmental, and behavioral factors, resulting in multiple pathophysiological abnormalities. A single-target drug may address one aspect but fail to provide comprehensive management.

Lekhaniya Mahakashaya addresses multiple pathophysiological aspects simultaneously: it enhances digestive capacity (*Deepana-Pachana*), improves fat metabolism (*Medohara*), cleanses channels (*Srotoshodhana*), reduces inflammation (*Shothahara*), provides antioxidant protection, and restores normal *Dosha* balance [1]. This multi-targeted approach is consistent with the modern concept of polypharmacology, where drugs acting on multiple targets may be more effective for complex diseases than single-target drugs [42].

Furthermore, the constituent drugs of *Lekhaniya Mahakashaya* exhibit synergistic interactions. For example, *Haridra*'s anti-inflammatory and insulin-sensitizing effects complement *Musta*'s antioxidant and lipid-lowering properties, while *Chitraka*'s thermogenic effects enhance the overall metabolic-boosting action of the formulation. This synergy may explain why the complete formulation is more effective than individual components [43].

5.3 Limitations of Current Evidence

Despite promising clinical results, the current evidence base for *Lekhaniya Mahakashaya* has several limitations. Most clinical studies are small-scale, single-center trials with short follow-up periods. Many lack proper randomization, blinding, and placebo controls, limiting the strength of conclusions. There is also considerable heterogeneity in formulation composition, preparation methods, dosing regimens, and outcome measures across studies, making it difficult to compare results and draw definitive conclusions [44].

Standardization of herbal formulations remains a significant challenge. Unlike synthetic drugs with defined chemical structures, herbal preparations contain multiple bioactive compounds whose concentrations may vary depending on plant source, growing conditions, harvesting time, and processing methods. This variability can affect clinical efficacy and reproducibility of results [45]. Recent efforts to develop

standardized *Lekhaniya Mahakashaya* preparations using high-performance liquid chromatography (HPLC), high-performance thin-layer chromatography (HPTLC), and Fourier-transform infrared spectroscopy (FTIR) represent important steps toward ensuring quality and consistency [46].

Another limitation is the lack of long-term safety data. While short-term studies report minimal adverse effects, the safety of prolonged use (beyond 3-6 months) has not been systematically evaluated. Additionally, potential herb-drug interactions, particularly with commonly prescribed medications for diabetes, hypertension, and dyslipidemia, require investigation [47].

5.4 Future Research Directions

To establish *Lekhaniya Mahakashaya* as an evidence-based therapy for lifestyle disorders, several research priorities should be addressed. First, large-scale, multi-center, randomized controlled trials with adequate sample sizes, proper blinding, and long-term follow-up are needed. These trials should use standardized formulations, clearly defined inclusion and exclusion criteria, and validated outcome measures including anthropometric parameters, lipid profiles, glycemic indices, inflammatory markers, and quality of life assessments [48].

Second, mechanistic studies are needed to elucidate the molecular pathways through which *Lekhaniya Mahakashaya* exerts its therapeutic effects. In vitro studies using adipocyte cell lines, hepatocyte cultures, and pancreatic beta cells can investigate effects on lipogenesis, lipolysis, glucose uptake, insulin secretion, and inflammatory mediator production. In vivo studies using animal models of obesity, dyslipidemia, and metabolic syndrome can evaluate effects on body weight, fat distribution, lipid profiles, glucose homeostasis, and tissue pathology [49].

Third, pharmacokinetic and pharmacodynamic studies are needed to understand the absorption, distribution, metabolism, and excretion of key bioactive compounds in *Lekhaniya Mahakashaya*. These studies can inform optimal dosing regimens and identify potential drug interactions [50].

Fourth, comparative effectiveness research is needed to evaluate *Lekhaniya Mahakashaya* against standard modern therapies (statins, metformin, orlistat) and other Ayurvedic formulations. Such studies can help position *Lekhaniya Mahakashaya* within the therapeutic landscape and identify patient populations most likely to benefit [51].

Finally, implementation research is needed to understand how *Lekhaniya Mahakashaya* can be effectively integrated into clinical practice. This includes developing clinical practice guidelines, training healthcare providers, ensuring quality control and standardization of

formulations, and addressing regulatory and reimbursement issues [52].

6. CONCLUSION

Lekhaniya Mahakashaya represents a time-tested Ayurvedic formulation with significant therapeutic potential for managing lifestyle disorders including obesity, dyslipidemia, and metabolic syndrome. The concept of *Lekhana Karma* provides a unique theoretical framework for understanding how specific pharmacodynamic properties—*Tikta, Katu* and *Kashaya Rasa*; *Laghu, Ruksha,* and *Tikshna Guna; Ushna Virya*; and *Katu Vipaka*—translate into clinical benefits.

The ten constituent drugs—*Musta, Kushtha, Haridra, Daruharidra, Vacha, Ativisha, Katurohini, Chitraka, Chirabilva,* and *Haimavati*—each contribute unique pharmacological properties that work synergistically to address multiple pathophysiological aspects of lifestyle disorders. Clinical evidence, though limited in scale and methodological rigor, consistently demonstrates improvements in anthropometric parameters, lipid profiles, oxidative stress markers, and metabolic indices, with minimal adverse effects.

The multi-targeted approach of *Lekhaniya Mahakashaya*, addressing digestive function, fat metabolism, channel cleansing, inflammation, oxidative stress, and *Dosha* balance simultaneously, offers advantages over single-target modern therapies. This holistic approach aligns with the complex, multifactorial nature of lifestyle disorders and the modern concept of polypharmacology.

However, to establish *Lekhaniya Mahakashaya* as an evidence-based therapy, larger randomized controlled trials with standardized formulations, mechanistic studies elucidating molecular pathways, pharmacokinetic and pharmacodynamic investigations, comparative effectiveness research, and implementation studies are needed. Addressing these research priorities will help realize the full therapeutic potential of this classical Ayurvedic formulation in the contemporary management of lifestyle disorders.

In an era of rising prevalence of obesity, dyslipidemia, and metabolic syndrome, coupled with concerns about the cost, side effects, and long-term sustainability of modern pharmacotherapy, *Lekhaniya Mahakashaya* offers a promising complementary or alternative therapeutic approach rooted in traditional wisdom and supported by emerging scientific evidence.

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