



(REVIEW ARTICLE)



A review on a selected *Ayurvedic* herbal formula in the management of obesity: A critical analysis

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Abstract

Obesity is spreading widespread among people worldwide and it is starting to overtake malnutrition and infectious diseases as the main cause of poor health. Obesity is specifically linked to diabetes mellitus, coronary heart disease and a few types of cancer and breathing problems. *Cinnamomum tamala* and *Curcuma longa* were the ingredients of a decoction from an authentic text and this review's objective was to investigate how the herbal formula of decoction from the *Rasaratna Samuccya* effective to treat obesity. Information about obesity was acquired from *Ayurvedic* scriptures, contemporary texts and earlier research studies (from primary and secondary sources). A survey of the literature was done on those two herbs in the selected decoction and examined for their *Pancha Padārtha* (5 elements of herb) and pharmacological qualities regarding in the management of obesity. *Ayurvedic Pancha Padārtha* study has revealed that selected herbal formula has anti-obese quality because of their compatibility with *Lēkhana* (scraping quality), *Shōshana* (absorbing quality) *Guna* and *Shleshma Prakurti*. The majority of studies have demonstrated the anti-obesity effects of herbal formula, reviewed articles have also highlighted additional qualities that aid in lowering excess fat in obese individuals. According to the literature review and *Pancha Padārtha* analysis, selected herbal formula is useful in the treatment of obesity.

Keywords: Anti hyperlipidemia; Anti-obese; Obesity; Overweight; *Sthaulya*

1. Introduction

The illness process of obesity is characterized by an excessive buildup of body fat and has a complicated genetic-environmental etiology, which has many harmful effects on different organs. According to this definition, BMI (Body Mass Index=[Weight (kg)/ Height (m²)]) is a measure of adiposity and it has been widely believed that obesity is less detrimental in older adults because of the finding that the BMI value linked with the lowest relative mortality is slightly higher in older adults than in younger adults ^[1]. According to the World Health Organization (WHO), central obesity is defined as a waist circumference more than 102 cm for males and 88 cm for women. Several people use BMI (kg/m²) to measure adiposity and BMI more than or equal to 25 kg/m² is considered overweight. Pre-obesity is defined as BMI between 25 and 30 kg/m² and obesity is defined as BMI more than 30 kg/m². The three categories of obesity are class I (30 to 35 kg/m²), class II (35.0 to 40 kg/m²) and class III (above 40 kg/m²) yet, the term "overweight" is not used regularly in today's society ^[2].

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Obesity is an associated feature of certain conditions, such as Prader-Willi syndrome and Cushing's syndrome. Hormonal imbalance is often incriminated in women, but weight gain is usually small and due to water retention. Genetic and environmental factors, food intake, control of appetite, energy expenditure, physical exercise and thermogenesis are all linked to obesity. Thermogenesis is lower in obese and post-obese subjects than in lean subjects, likely due to dietary induced thermogenesis [3] [4]. This is one of the major public health problems worldwide owing to its high prevalence and consequential morbidity & mortality. Globally 44% diabetes mellitus, 7% of ischemic heart diseases & 41% of certain cancers are attributable to overweight and obesity in 2015 [5].

According to Ayurveda, obesity also known as *Athisthoulya*, is the result of an excessive buildup of the substance *Medō Dhātu* (fat tissue) in the body. Different *Āchāryās* have different ways of describing the state of "*Sthula*" or "*Sthoulya*," and obesity, which is brought on by *Medōdhātavāgnimāndya* (less metabolism of fat tissue) is referred to as *Medōroga* or *Sthoulya Rōga*. Obesity is discussed in *Vriddhatraya* and *Laghutraya*, according to Ayurveda. *Charaka Samhitā*, *Susruta Samhitā* and *Ashtānga Hrdya Samhitā* (major classical texts) are examples of *Vriddhatraya*. The primary causes of obesity in accordance with *Charaka Āchārya*, include overeating, eating foods that are heavy, sweet, cooling and unctuous, not exercising, refraining from sexual activity, sleeping throughout the day and inherited factors [6]. According to the *Susruta Samhitā*, the subsequent *Dhātus* (tissues) suffer from one of the seven diseases such as carbuncles, fevers, fistulas in abscesses and *Vātika* disorders which results in poor vitality and eventual death [7]. Derangement of the *Agni* or digestive strength according to *Ashtāngahrdayam*, results in the creation of *Āma* (undigested food). This inhibits the creation of new tissue and disrupts the *Agni* of the *Medō Dhātu* [8].

Sārangadhara Samhitā, *Bhāvaprakāsha*, and *Mādhava Nidhāna* are all part of the *Laghutraya* (minor classical texts). According to *Mādhava Nidhāna*, being obese is when a person's breasts, buttocks and abdomen start to move during physical activity as a result of the buildup of fat in certain areas of the body [9]. *Sthoulya* was cited by *Āchārya Sārangadhara* as a quality of the *Shleshma Prakruti* [10]. *Bhāvamishara* placed more emphasis on risk factors, morbidity and other behavioral treatments [11].

Ayurveda & contemporary medicine can be used to treat disease and contemporary management prioritizes lifestyle guidance, diets for weight loss, medications and surgeries. Anti-obesity drugs are used in the short term to maximize the weight loss achieved with low-calorie diets, but are not used in the long-term maintenance of weight. The discipline of Ayurveda has used *Ayurvedic* medications that contain the properties of *Medōhara* (reduce fat) & *Lēkhaniya* to treat obesity. Herbs were selected from authentic text, *Rasaratna Samuccaya* and it is mentioned in *Kshudrarōgādi Chikitsithaya*. Decoction chosen from an authentic book has the following ingredients: *Haridrā* (*Curcuma longa*) and *Thēja Patra* (*Cinnamomum tamala*) and it lower the body's serum cholesterol as well as excessive *Mēda* (fat) [12].

The current study based on an *Ayurvedic* medicinal formula that used in obesity that written over *Rasaratna Samuccaya*. The study critically analyzed the pharmacological activities of the ingredients in selected formula in the management of obesity.

Aims and objectives

The study was created to determine the anti-obese activity of the ingredients in selected herbal formula in the management of obesity.

2. Research methodology

The literary review was referred through authentic Ayurveda classics such as *Rasaratna Samuccya*, *Charaka Samhitā*, *Susruta Samhitā*, *Ashtāngahrdayam*, *Mādhava Nidāna* also from *Sāranghadara Samhitā*, *Bhāvaprakāshaya* and Ayurveda Pharmacopiea. The review on obesity was conducted through recent scientific explanations and findings which published in official websites and indexed journals, articles, books, reports of WHO and encyclopedias. The gathered information was compared with traditional and modern scientific explanations using based on pharmacological characteristics, *Rasa* (taste), *Guna* (quality), *Veerya* (potency), *Vipāka* (last taste) and *Prabhāva* (specific action).

2.1. Review

Herbal Formula chosen from an authentic book, *Rasaratna Samuccaya* has two ingredients: (Table 1).

Table 1 Review of selected herbs

Ingredients	<i>Cinnamomum tamala</i>	<i>Curcuma longa</i>
Family	Lauraceae	Zingiberaceae
Sanskrit name	<i>Thēja Patra</i>	<i>Haridrā</i>
Part used	Leaf and bark	Rhizome

2.2. *Cinnamomum tamala* (*Thēja Patra*)

Thējpatra is a little tree that can reach a height of 20 to 30 feet and is found throughout Sri Lanka and South India in areas with a moderate environment. Cinnamaldehyde (70-85%) is a key component of bark oil. The volatile oil produced by Nepalese leaves primarily contains linalool (54.55%), cinnamaldehyde (1.45%), alpha and beta-pinene, p-cymene, and limonene. The majority of the essential oil from the leaves is mainly included monoterpenoids. Phenylepropanides are hardly found. Leaf, bark and oil are the parts used.

Cinnamomum tamala has *Katu* (pungent), *Tikta* (bitter) and *Madhura* (sweet) *Rasa*, *Laghu* (lightness) *Rūksha* (dry) *Theekshna* (penetrative) *Guna*, *Katu Vipāka* (final taste is pungent), *Ushna Veerya* (hot potency), *Kapha Vāta Shāmaka* (palliative of body humors) and *Pittavardhaka* (increase pitta humor) action [13].

Hypoglycemic, antioxidant and hypo-lipidemic actions are main pharmacological effects. Obesity is treated using leaf ointment and the compound pill is used to treat dyspepsia, flatulence and cough use as a diuretic and healthy for the liver and spleen. In order to produce chemo-preventive, anti-cancer, antiulcer, immune-modulatory, anti-lipidemic as well as anti-diabetic and hepato-protective medicines with potential for broad-spectrum biological activity, and further advocates a greater usage of *Cinnamomum tamala* and its associated species [14] [15] [16].

The investigation was to determine if *Cinnamomum tamala* leaf extracts have a hypo-lipidemic effect in high cholesterol diet-induced hyperlipidemia 400 mg/kg/day dosages of each of the aqueous and ethanolic extracts of *Cinnamomum tamala* Nees' leaves were given for ten days. It is effective in the management of obesity [17].

Jawaida et al (2014) examined the effects of an aqueous extract from *Cinnamomum tamala* leaf in rats that had been given an experimentally induced hyperlipidemia. In both high fat diet- and Triton X-100-induced hyperlipidemic rats, CTLE dramatically decreased the TC, TG, LDL-C and increased the HDL-C [18]. In contrast to considerable increases in HDL levels, simultaneous administration of *cinnamomum* leaf extracts considerably prevents the rise in serum levels of total cholesterol, triglycerides, LDL cholesterol, VLDL cholesterol and the atherogenic index [19] [20] [21].

Thilawat et al (2017) in this study, a total of 30 patients with hypercholesterolemia received treatment with 1g twice daily doses of bark powder from *Cinnamomum zeylanicum* and *Cinnamomum tamala* for three months. Results were evaluated in terms of clinical improvement, symptom alleviation and lipid profile [22].

2.3. *Curcuma longa* (*Haridrā*)

The rhizomes of turmeric, a flowering plant in the ginger family Zingiberaceae, are used in cooking. The plant is a perennial, rhizomatous, herbaceous species that is indigenous to Southeast Asia and the Indian subcontinent. Diaryl heptanoids, a class of compounds that includes several curcuminoids like curcumin (3.14%), demethoxycurcumin and bisdemethoxycurcumin are among the phytochemical elements of the turmeric plant. Contain zingiberene, atlantone, germacrone, turmerone and more. Rhizome is the portion used. *Curcuma longa* has *Tikta Katu Rasa*, *Laghu Rūksha Guna*, *Katu Vipāka*, *Ushna Veerya* and *Thridōsha hara* (palliative of 3 body humors) action [23].

Budiman et al (2015) in this study, curcumin and the extract of *C. longa* L. may contain substances that have anti-obesity properties. In comparison to curcumin, *C. longa* L. extract is more effective at preventing the synthesis of triglycerides and cholesterol with inhibition activities of 70.43% and 66.38%, respectively, at the maximum concentration [24] [25].

Hemorrhoids are treated with turmeric ointment. Additionally, it inhibits the growth of facial hair is used to treat diabetes, has anti-atherosclerotic properties, is used to treat allergic rhinitis, has antioxidant properties, has an immune-modulatory effect, detoxifying properties, controls liver function, treats anemia, is good for the eyes, and is used as a calcium supplement

Curcumin polyphenols exhibit anti-angiogenic activity, which reduces body fat and weight accumulation [26]. The early growth response (Egr-1) gene, which is linked to the onset of obesity, is also inhibited by *C. longa*. It is evident that *C. longa* may be beneficial for the management of obesity by altering leptin, adiponectin, inflammatory mediators, ROS, controlling dietary environment, Egr-1 gene, lipogenic gene [27]. Curcumin has anti-hyperlipidemic effects by boosting fatty acid uptake, anti-obesity effects by reducing lipogenesis and antihypertensive effects by raising nitric oxide [28] [29] [30]. In diabetic rats, curcumin shown reduction of phospholipid and cholesterol as well as. Under diabetes conditions, the liver's phospholipid, triglyceride, and cholesterol levels were higher. Dietary curcumin demonstrated a clear propensity to reverse these alterations in the liver's lipid fractions. Curcumin's effects were also observed in diabetic rats kept on a high-cholesterol diet [31]. Tomar et al (2012) demonstrates the hypolipidemic effect as well as additional actions as antiviral and platelet aggregation inhibition [32], [33].

3. Results and Discussion

The states of "*Sthula*" or "*Sthoulya*," and obesity are described in various ways by various *Āchāryās*. *Charaka Samhitā* includes primary causes of obesity while *Susruta Samhitā* and *Ashtānga Samgrāha* explain *Samprāpti* or pathogenesis of obesity. Various definitions are given in *Mādava Nidāna*, *Sārangadhara Samhitā* and *Bhāvaprakāsha*. Modern treatments like medications, weight loss diets and surgeries are mentioned in modern text [4].

Pancha Padārtha analysis in Ayurveda shows that due to *Lēkhana* and *Shōshana Guna* selected formula has anti-obese properties. Both plants share *Katu* and *Tikta Rasa* as well as additionally shared by the two plants is *Laghu Rūksha Guna*. Both are *Ushna Veerya*, *Katu Vipāka*. According to many *Āchārya Lēkhana Guna*, which is present in *Katu Tikta Rasa*, scrapes the body of surplus *Kapha* and *Mēdha*. *Shōshana Guna* which is absorbed extra fluids and fat. *Laghu* and *Rūksha* are the two *Gunās* that stand out the most, according to analysis of *Guna*. These *Gunās* aid in the reduction of *Kapha* and *Mēda* in obesity. According to *Veerya* analysis, *Ushna* is the most notable *Veerya* and *Ushna Veerya* aids in the decline of obesity. *Vipāka* analysis shows that *Katu Vipāka* is the most prominent and the blood flow is restored to normal after the impediment is removed based on *Dōsha Karma*. In the treatment of obesity *Tridōshahara*, *Kaphahara* and *Vātahara Karma* are helpful. Hence, the selected decoction that was chosen is efficient in the control of obesity, according to *Pancha Padārtha* study.

According to reviewed articles, herbs in selected decoction are potential natural bioactive substances with a wide range of pharmacological effects. As well as explained that they exhibit a variety of mechanisms of action and have an impact on the biochemical and physiological control of cells. The literature review indicates that both herbs in the selected decoction are hypolipidemic and anti-obesogenic. Also selected decoction show anti-diabetic action in turn which reduces the excess fat because diabetes mellitus is attributable to overweight and obesity. Another idea is that these selected decoction show anti-oxidant activity and it reduces obesity as potent anti-oxidant activity is responsible for hypolipidemic properties directly and indirectly.

Obesity treatment by changes in leptin, adiponectin, inflammatory mediators, ROS, dietary environment control, Egr-1 gene, and lipogenic gene [29]. Curcumin has anti-hyperlipidemic properties through increasing fatty acid absorption, anti-obesity properties by decreasing lipogenesis and antihypertensive properties. anti-angiogenic action, liver function regulation, anemia treatment, anti-atherosclerotic qualities with anti-diabetic [28].

More and more selected herbs-containing products that are advised for the prevention of obesity are available in pharmacies. However, in order to determine whether these selected decoction may be used to treat and prevent obesity in humans, more thorough and conclusive human research must be conducted.. They exhibits both cytotoxic and cytoprotective properties. Hence, selected decoction is efficient in the treatment of obesity.

4. Conclusion

Obesity as an important public health problem has been discussed in recent few decades worldwide. Three kinds of obesity can be distinguished based on the investigation of clinical aspects, *Heenasthaulya* (overweight), *Madyasthaulya* (obesity classes 1 and 2), and *Atisthaulya* (Severe morbid obese). *Cinnamomum tamala* and *Curcuma longa* are useful in the control of obesity according to the review of the literature and the *Pancha Padārtha* examination. The previous studies of pharmacological effects have revealed that these herbs in the selected herbal formula have strong anti-obesity capabilities. There is an urgent need to reduce the prevalence of overweight and obesity among people worldwide.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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