

Review article

# Literature Review on the Efficacy of Selected Herbs from Rasaratna Samuccaya in the Management of Sthaulya (Over Weight & Obesity)

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## ABSTRACT:

Obesity is a medical circumstance in which intemperance body fat has accumulated to the extent that it may have a harmful effect on health. Obesity is a life threatening disease. Obese people are more likely than others to develop risky conditions such as cardiovascular disease, gallbladder disease and certain cancers. Obesity is one of the major public health problems worldwide owing to its high prevalence and consequential morbidity and mortality. Globally, 44% of diabetes mellitus, 7% of ischemic heart diseases and 41% of certain cancers are attributable to overweight and obesity in 2015. In Ayurveda there is wide scope of research to find out the safest remedy for obesity. The purpose of this review is to study the efficacy of the selected herbs from Rasa Ratna Samuchchya text in the management of obesity. The information was gathered related to obesity from Ayurveda texts, modern texts and previous researches (from primary and secondary sources). Five herbs were assumed to be effective in obesity. Then literature review was carried out about those five selected herbs and also analyzed according to Pancha Padartha and pharmacological properties. According to literature review & analysis of ingredients of selected herbs are effective in the management of obesity. The Selected herbs are *Terminalia chebula*, *Terminalia liabellirica*, *Phyllanthus emblica*, *Plumbago indica* and *Pterocarpus marsupium*.

**Keywords:** overweight, obesity, anti obese, anti hyperlipideamic, *Sthaulya*.

## 1. INTRODUCTION

World Health Organization (WHO) defines obesity as ‘a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that the health may be impaired’. BMI (kg/m<sup>2</sup>) is widely used to assess adiposity. Overweight is defined as a BMI equal to or in excess of BMI of 25 kg/m<sup>2</sup>. When BMI is from 25 to <30 kg/m<sup>2</sup>, it is called pre obesity and when it is 30 kg/m<sup>2</sup>, it is called obesity. Obesity in turn is subdivided into 3 classes as class I (30 to <35 kg/m<sup>2</sup>), II (35.0 to <40 kg/m<sup>2</sup>) and III (40 kg/m<sup>2</sup>). However in present society, the definition of the overweight is not used consistently [1]. Disease can be reviewed as Ayurveda & modern. According to modern view of obesity it is defined as abnormal or extensive fat accumulation that negatively affects health. Obesity is almost invariable in developed countries and almost all people accumulate some fat as they get older. The world Health Organization acknowledges that obesity (Body mass index 30kg/m<sup>2</sup>) is a

world-wide problem which also affects many developing countries. Obesity implies an excess storage of fat and this can most easily be detected by looking at the undressed patient. Most patients suffer from simple obesity, but in certain conditions obesity is an associated feature (Eg : Prader – willi syndrome, Cushing’s syndrome, etc.) Even in the latter situation, the intake of calories must have exceeded energy expenditure over a prolonged period of time, Hormonal imbalance is often incriminated in women (eg :- post menopause or when taking contraceptive pills), but must weight gain in such cases is usually small and due to water retention. Not all obese people eat more than the average person, but all obviously eat more than they need. [2] According to WHO obesity is defined as BMI equal or more than 30kg/m<sup>2</sup> & central obesity as waist circumferences greater than 102cm in men & 88cm in women. Modern management focuses on lifestyle advice, weight loss diets, Drugs & surgeries [3]. Obesity has traditionally been considered as a health problem of affluent countries, while under nutrition and infectious diseases were

considered to be major problems in the developing countries. However, with the recent escalation of obesity rates worldwide, developing countries, particularly ones in South Asia, are facing a double burden of over nutrition and under nutrition. Sri Lanka is a country in South Asia, with a population of more than 20 million. Sri Lanka recently obtained the lower middle-income status. According to the World Health Organization (WHO) non communicable diseases (NCDs) country profiles, the prevalence rates of overweight (BMI  $\geq 25$  kg/m<sup>2</sup>) and obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) among Sri Lankans were 5.1% (2.6% males and 7.4% females) and 21.9% (16.7% males and 26.8% females) respectively in year 2008.

In addition female sex, urban living, higher education, higher income and being in the middle age were shown to be associated with overweight and obesity in Sri Lankans. Relatively high prevalence of overweight and obesity, particularly, abdominal obesity among adults in Sri Lanka. Urgent public health interventions are needed to control the problem at an early stage [4].

According to Ayurveda obesity or *asthithoulya* can be defined as excessive deposition of *medodhatu* in the body. The state of '*sthula*' or '*sthoulya*' is described by different *acharya*'s in their own way and obesity is described as *Medoroga* or *Sthoulya Roga* which is caused due to *medodhatavagnimandya*.

The ayurvedic drugs which consist of the property of *Medohara* & *Lekhaniya* have been used in the management of obesity in the field of Ayurveda. Herbs selected from an authentic text, *Rasarathna Samuccaya*, *kshudra roga dichikitsithaya* page number 268, contains these ingredients :*Triphala*, *Asana*, *Chitraka*. *Triphala* is combination of 3 healing herbs *Haritaki*, *Vibhitaki*, *Amalaki*. It decreases excessive *meda* and reduces serum cholesterol. *Asana* also reduces fat & cholesterol levels. *Chitraka* decreases *meda* and useful for obesity [5].

According to Ayurveda obesity is described in *Vruddatraya* & *Laghutraya*. *Vruddatraya* include *Charaka samhita*, *Susruta samhita* & *Astangahrdaya samhita*. According to *Charaka acharaya* over intake of food, intake of heavy, sweet, cooling & unctuous food, lack of physical exercises, abstinence from sexual intercourse, day sleep and hereditary are the main reasons for obesity [6]. According to *Susruta samhita* successive *dhatu*s are not nourished leading to low vitality & lastly dies being victim of one of the seven diseases like carbuncle, fever, fistula in an abscess & *vatika* diseases [7]. According to *Astangasamgraha* derangement of *agni* or digestive power lead to production of *Ama*. This disturbs *agni* of *medhadhatu* & blocks the formation of further tissue. Improperly formed fatty tissue accumulates in the body & causes obesity [8].

*Laghutraya* includes *Madhavanidhana*, *sarangadharasamhita* & *Bhavaprakasha*. According to *Madhavanidhana*, obese is when a person's buttocks, abdomen and breasts beginning to movements during activities due to accumulation of fat in

those places [9]. *Acharya Sarangadhara* mentioned *sthaulya* is a characteristic of *shleshmaprakruti* [10]. *Bhavamishara* emphasized more on risk factors, morbidity & other additional behavioral therapies [11].

*General objective:*

To study the efficacy of the selected herbs in the management of *Sthoulya*.

*Specific objectives*

To identify special *guna karma*, pharmacology and specially anti obese activity of selected herbs

## 2. RESEARCH METHODOLOGY

Collection of information about obesity through Ayurvedic books, modern books and previous researches. Study about the ingredients and *Guna karma* of selected herbs in the management of obesity.

Analysis according to *rasa*, *guna*, *veerya*, *vipakaprabhava* and pharmacological properties. Finally interpretation of the discussion and conclusion.

Collection of Information from Ayurveda texts, modern texts and published articles.

- *Rasa Ratna Samuchchya*
- *Charaka Samhita*
- *Susruta Samhita*
- *Ashtanga Samgraha*
- *Madhava Nidana*
- *Saranghadara Samhita*
- *Bhavaprakashaya*
- *Ayurveda Pharmacopiea*
- *Kumar and Clark clinical medicine*
- *Davidson's medicine*

This research was designed to find out the anti-obese activity of selected herbs as a literature survey.

## 3. REVIEW OF SELECTED HERBS

1. *Terminalia chebula*

2. *Terminalia bellirica*

3. *Phyllanthus emblica*

4. *Plumbago indica*

5. *Pterocarpus marsupium*

*Terminalia chebula* (*Haritaki*)

Family: *Combretaceae*

Latin name: *Terminalia chebula*

Synonyms: *Abhaya*, *Amugha*, *Amruta*

English: *Chebolic Myrobalana*

Sinhala: *Aralu*

A moderate sized tree with a very thick, grey-brown bark, crooked trunk and many spreading branches drooping at the extremities and pubescent young parts. Grows in India, Burma, Ceylon and Malay Peninsula. The fruits contain a mixture of gallic acid and tannic acid, apparently derived from an organic acid, *chebulinic acid*, they contain, also a greenish oleo-resin which is termed *myrobalanin*. Part use is *Pericarp* of fruit. This has *Hypolipidaemic*, *Medohara*, *Anti*

diabetic, Lekhana, Stimulate liver, Agni vardhaka, Cardio tonic, Rasayana and Bhedakagunas. The pericarp of the dry fruit in decoction is a good purgative. It is finely powdered and used as a dentifrice useful for carious teeth, bleeding and ulceration of the gums. Along with other drugs, it is used in fever, all diseases of the eye, piles and 80 types of dropsy. Hypolipidemic activity of *T. chebula* extract against experimentally induced atherosclerosis have been documented. As well as it is important to have possessed hypocholesterolemic activity against cholesterol-induced hypercholesterolemia and atherosclerosis [12].

Research paper on effect on *T. chebula* fruit on joint mobility, comfort and functional capacity on healthy overweight subjects [13] proved *T. chebula* was effective in reduction of weight in obesity. Research paper on effect of gomutraharitaki in the management of obesity [14] proved that it had reduced increased medodhatu in sthauilya. Research paper on effects of medicated enema and nasal drops using Thriphaladi oil for obesity [15] suggested that nasya karma by thriphaladi oil may be adopted as more practical in the management of obesity. Research paper on lekhanabasti in hyperlipidaemia [16] was found to have significant effect in reducing the symptoms of medodushti and reduction of objective parameters like weight, BMI, body fat percentage and body circumference. Research paper on lekhanabasti in medoroga [17] was highly effective in reducing cholesterol level. Research paper on hypolipidaemic activity of Haritaki [18] produced a significant decrease in the serum level of lipids in atherogenic diet induced hyperlipidaemia in rats. Research paper on study of gomutraharitaki in kaphamedoavarana [19] showed better results on dyslipidaemia. Research paper on therapeutic uses of Thriphala [20] proved the decrease of percentage of body fat, body weight and total cholesterol, triglycerides and LDL.

#### *Terminalia bellirica*

Family: Combretaceae

Latin name: *Terminalia bellirica*

Synonyms: Anilaghna, Baheduka, Bahuvirya

English: Belleric Myrobalan

Sinhala: Bulu

A large, deciduous tree with a straight, buttressed trunk and long, horizontal branches. Grows in the forests of India, Burma, Ceylon & Malaya. Main chemical constituents are tannins mainly include  $\beta$ -sitosterol, gallic acid, ellagic acid, ethyl gallate, galloyl glucose and chebulagic acid. Part use is pericarp of the fruit. In India, it is chiefly employed in dropsy, piles, diarrhoea, leprosy & fever. Pharmacological effects are Anti oxidant, Bhedaka, Anti hypertensive, Rasayana Purgative, Agni vardhaka, Anti pyretic, Lekhana and Medohara [21]. *T. belerica* also shows antidiabetic activity. Administration of different doses of hexane, ethyl acetate and methanolic fruit extracts of *T. belerica* for two months in Streptozotocin induced diabetic rats expressively improved the plasma insulin, C-peptide, glucose tolerance

levels, body weight and serum total protein. Moreover plant extract also reduced the cholesterol, urea, uric acid and creatinine levels in serum in diabetic rats. It has been reported that continuous administration of 75% *T. belerica* methanolic extract blocks hyperglycaemia in diabetic rats. Research on effect of Thriphala in hyperglycemic activity [22] had showed best results for obesity as diabetes and obesity often go together. Research paper on herbal formulation for obesity [23] proved to be a safe therapeutic agent and effectively decreased the anthropometric parameters like body circumferences and skin fold thickness in overweight individuals. Research paper on therapeutic course of basti in obesity [24] showed a significant decrease in weight, BMI and body circumferences.

#### *Phyllanthus emblica*

Family: Euphorbiaceae

Latin name: *Phyllanthus emblica*

Synonyms: Adhipala, Akara, Amalaki, Amlika

English: Emblic Myrobalan Tree

Sinhala: Nelli

A small or middle – sized tree, about 10m high, with a crooked trunk and spreading branches. Grows in tropical and subtropical parts of India, Ceylon, Malay Peninsula and China. Experimental evidence suggested that its fruit had several phytochemicals such as gallic acid, ellagic acid and pyrogallol. The unripe fruit is cooling, laxative and diuretic. Part use is pericarp of fruit. This has Hypolipidaemic, Medohara, Anti oxidant, Lekhana, Bhedaka Agni vardhaka [24]. It has been reported that the tannoid principles of aqueous extract of amla are a potent inhibitor of lipid peroxide generation and a scavenger of hydroxyl and superoxide radicals in vitro and viva. Research on effect of *P. emblica* on overweight class 1 obese adults. Kanna et al, 2015 [25] showed significant decrease in LDL, Cholesterol/HDL ratio. Research on Thriphala regulates adipogenesis through modulation of expression of adipogenic genes in 3T3-L1 cell line [26] showed significant decrease in adipogenesis, lipid accumulation and inhibition of adipogenic genes. Research on evaluation of effects of *P. emblica* in lipid profile [23] showed improved lipid profile and Rasayana properties.

#### *Plumbago indica*

Family: Plumbaginaceae

Latin name: *Plumbago indica*

Synonyms: Agni, Atidipya, Chtraka, Chtranga

English: Rosy-flowered Leadwort

Sinhala: Ratnetol, Ratnitul

A perennial glabrous herb, more or less climbing with striated stems and with long succulent roots. Grows in South Asia and now cultivated throughout India & Ceylon. The root bark of this plant contains plumbagin. Oil is employed as an application for rheumatism, paralysis & leprosy. Part use is root stem [22]. This has Anti microbial, Anti aging and Abortifient properties. Research on herbal formulation

for obesity [24] proved to decrease the anthropometric parameters like body circumferences and skin fold thickness. Research on survey of Thrimad for its anti obesity potential [25] proved for beneficial in obesity. Research on survey of obesity [26] showed reduction of cholesterol and weight. Research on lekhaniyaka shayavasti in sthoulya [27] proved that it was effective in weight reduction and has medoghana activity. Research on Plumbagozeylanica mini review [28] showed significant in losing weight and body circumferences. Research on Lipocare on markers of dyslipideamia [28] showed significant hypolipideamic effect.

*Pterocarpus marsupium*

Family: Leguminosae

Latin name: *Pterocarpus marsupium*

Synonyms: Asana, Bandukapushpa, Bijaka

English: Indian kino tree, Bastard Teak

Sinhala: Gammalu, Ganmalu

A large, stout, deciduous tree with a thick, yellowish-grey bark, wide spreading branches. Common in India & Ceylon. The wood contains catechin, kinotannic acid, kino-red and an alkaloid. The red latex tapped from the tree is used for diabetes. The gum is useful for toothache and the bark as an astringent. Part use is stem bark [29]. This has Hypolipidaemic and Laxative effects. Pharmacopoeia of India, it has been described to be used in the treatment of krmiroga (worm infection), kustha (leprosy), prameha(diabetes), pandu (anemia), and medodosa (obesity). Multiple studies have demonstrated the antioxidant activity of pterostilbene in both in vitro and in vivo models demonstrating both preventive and therapeutic benefits such as antioxidant, neuroprotective, anticancer, cardioprotective, analgesic, antiaging anti-diabetic, antitussive, antiinflammatory, anthelmintic, and anti-obesity activities have been studied for pterostilbene. Research on asanadi Ghana vati in kaphamedomargavarana [30] showed better results on dyslipideamia and works at the level of 124 jataragni. Research on evaluation of varaasanadikwatha [31] showed better results in the reduction of obesity. Research on pharmacological profile of *P. marsupium* [32] showed anti hyperlipideamic effects.

**4. RESULTS AND DISCUSSION**

*Terminalia chebula* has kashaya, amla, katu, tikta, madhura rasa, laghuruksahguna, ushnaveerya, and madhuravipaka and thridoshahara prabhava. So due to these gunas that it is effective in the management of obesity. Further it has hypocholesterolemic action.

*Terminalia bellerica* has kashaya rasa, laghuruksahguna, ushnaveerya, madhuravipaka and kapha pitta shamaka guna. So these properties reduce weight in the body by hypolipideamic action.

*Phyllanthus emblica* has pancharasa except lavana rasa, laghuruksahguna, sheetaveerya, madhuravipaka and

rthridoshahara guna. It reduced pathological medodhatu in the body and has a hypolipideamic action.

*Plumbago indica* has katu rasa, laghuruksathreekshanaguna, ushnaveerya, katuvipaka and kapha vata shamaka guna. These are beneficial in reducing pathological medodhatu. Also has anti diabetic activity which goes together with obesity. *Pterocarpus marsupium* has kashaya rasa, laghuruksahguna, sheetaveeryakatuvipaka and kapha pittashamaka guna. So it helps to reduce sthoulya because of medohara properties also it has anti diabetic activity.

Among selected herbs according to Rasa 2 are Madhura, 2 are Amla, 2 are Katu, 3 are Kashaya. According to Guna 5 are Laghu, 5 are Ruksha and 1 is Theekshana. According to Veerya 3 are Ushna, 2 are Sheeta. According to Vipaka 3 are Madhuravipaka and 2 are Katuvipaka. According to dosha karma 2 are Thridoshahara, 1 is KaphaVataShamaka, 2 is Kapha Pitta Shamaka.

**Table 1: Ayurveda properties of herbs**

Herb	Rasa	Guna	Veerya	Vipaka	Dosha karma
Haritaki	Pancharasa except lavana rasa	Laghu, Ruksha	Ushana	Madhura	Thridoshahara
Vibhitaki	Kashaya	Laghu, Ruksha	Ushana	Madhura	Kapha pita shamaka
Amalaki	Pancharasa except lavana rasa	Laghu, Ruksha	Sheetha	Madhura	Thridoshahara
Chitraka	Katu	Theekshana Laghu, Ruksha	Ushana	Katu	Kapha vata shamaka
Asana	Kashaya	Laghu, Ruksha	Sheetha	Katu	Kapha pita shamaka

According to analysis of Rasa, most prominent rasa is kashaya rasa. So have lekhanaguna that scrapes out excessive kapha and meda from srotas. Also has shoshanaguna which absorbs the excessive fluids and lipid substances. According to analysis of Guna most prominent gunas are laghu and ruksha. These gunas help to reduce meda and kaphain obesity. According to analysis of Veerya ushna is most prominent veerya. Ushnaveerya helps to reduce obesity. According to analysis of Vipaka, katuvipaka is most prominent. It removes the obstruction and normalizes the blood flow. (srotovivarana, kaphahara). According to dosha karma Thridoshahara, kaphahara and vatahara karma are beneficial in the management of obesity. So according to analysis of Pancha Padartha five herbs which were selected are effective in the management of obesity.

According to literature study Haritaki has anti-obese, anti-hyperlipideamic, anti diabetic and purgative properties. Vibhitaki has anti-obese, anti diabetic and purgative properties. Amalaki has anti-obese, anti-hyperlipideamic, anti diabetic, and purgative properties. Chitraka has anti-obese and anti-diabetic properties. Aasana has anti-obese, anti hyperlipideamic, anti-diabetic and purgative properties. After analysis of above properties selected herbs has 29% of

anti-obese property, 29% anti-diabetic property (obesity and diabetic often go together), 24% of purgative property (help to reduce weight) and 18% of anti-hyperlipidemic property. So, selected herbs are effective in the management of obesity.

#### 4. CONCLUSION

According to the analysis of clinical causes, signs & symptoms, complications, prevention, management and treatments we can identify three groups of obesity as Heenasthaulya (overweight), Madyasthaulya (obesity class 1 and 2), Atisthaulya (Severe morbid obese). According to the literature review and Pancha Padartha analysis of selected herbs; *Terminalia chebula*, *Terminalia bellerica*, *Phyllanthus emblica*, *Plumbago indica* and *Pterocarpus marsupium* are effective in the management of obesity. According to the analysis of pharmacological actions selected herbs show high anti obese properties.

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