

## A Review on effectiveness of Guggulu in treatment of obesity

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### Abstract

Obesity is not because it runs in the family; it is because the lifestyle and concept responsible for the people turn obese. *Sthaulya* has been included by *Acharya Charak* among *Ashtauninditiya Purusha*. Obesity has become epidemic today and it is essential to understand the consequences of obesity. In a world where food supplies are intermittent, fat cells, residing within widely distributed adipose tissue depots, are adapted to store excess energy efficiently as triglyceride and, when needed, release stored energy as free fatty acids for use at other sites. This physiologic system, orchestrated through endocrine and neural pathways, permits humans to survive starvation for as long as several months. Recent study reveals that obesity and its related disorders occupying major share in the spectrum of health, disease and management. It is one of the disorders of non-communicable disease, which has laid down foundation stone of diabetes mellitus, metabolic syndrome, hypertension and others. The aetio-pathogenesis, management and consequences of obesity are not very clear and it is still evolving in biomedical sciences. As a disease entity it is a multi-factorial metabolic disorders, very near to *Medoroga/Sthaulya* of *Ayurveda*. The prevalence of obesity is higher in urban areas than in rural populations of India, due to a steady erosion of the holistic way of life in the cities as well as the sedentary and overeating habit. The spiritual, psychological, and physical levels of human health and disease is given due importance in *Ayurveda*. The current understanding of adipose tissue as an endocrine organ coupled with the core principles drawn from *Ayurveda* may form a scientific basis for the management of obesity. *Guggulu* is one of the oldest *Ayurvedic* herbs taken orally for a variety of diseases. The term "*Guggul*" in Sanskrit means "protects against diseases. In course of the management of obesity *Guggulu* is a popular herbal drug which has been used as single form or compound form to treat several ailments since a long time in India. The oleo-gum or the resin of *Guggulu* obtained from stem is the main part, which has been used for therapeutic uses.

**Keywords:** *Sthaulya (Obesity)*; *Guggulu*, *Ashtaninditapurusha*; Non communicable disease

### 1. Introduction

Growing prevalence of obesity worldwide is an increasing concern surrounding the rising rates of Diabetes, Coronary and Cerebrovascular disease that pose a big threat in terms of health and financial hazards for the entire population of the world.

#### *Aim and objectives*

To see the effectiveness of *Guggulu* in the treatment of obesity according to various contemporary research and classical texts of *Ayurveda*.

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## 2. Material and methods

In this review article we searched several research database as well as *Ayurveda* classical texts like *Brihatrayi*, *Nighantu*, *Sharangdhar Samhita*, *Bhaisajya Ratnavali* etc. to see the most talked drug *Guggulu* and its role in the management of this disorder. Besides, we checked the modern mode of action of *Guggulu* in terms of dissolution of the fat tissue that might be the mainstay of the treatment of obesity.

### 2.1. Obesity in Ayurveda

*Charaka* has described obesity as a disease of the fat tissue (*Medoroga*) leading to hugeness (*sthoulyam*). The prevalence of obesity is higher in urban areas than in rural populations of India, due to a steady erosion of sedentary and overeating habit. The spiritual, psychological, and physical levels of human health and disease is given due importance in *Ayurveda*. The current understanding of adipose tissue as an endocrine organ and the concept derived from *Ayurveda* to get rid of it may form a scientific basis for the management of obesity.

### 2.2. Symptoms

- *Atisweda* [Excessive Sweating]
- *SharamjanyaShwasa* [Breathlessness on mild exertion]
- *Aatinindra* [Excessive sleep]
- *KaryaDorblyta* [Difficulty to perform heavy work]
- *Jadyatha* [Stuggishness]
- *Alpaayu* [Short life span]
- *Alpabala* [Decreased bony strength]
- *Utsahahani* [Inertness]
- *SharirDurgandhta* [Foul odour of the body]
- *Gadgadtava* [Unclear voice]
- *Kshudhavridhi* [Excessive hunger]
- *AtiTrishna* [Excessive thirst].

**Table 1** Complications of Obesity (*Sthaulya*) described in the texts of *Ayurveda*

Sr.no	Updrava	Sushruta samhita	Ashtangasangraha	Ashtanghriday	Yogratnakara	Bhav Prakash	Madanpalnighant u
1	<i>Prameha</i>	-	+	+	+	+	-
2	<i>Pramehapidika</i>	-	+	+	+	+	-
3	<i>Jwara</i>	+	+	+	+	+	+
4	<i>Bhagandara</i>	+	+	+	+	+	+
5	<i>Vidradhi</i>	+	-	-	-	-	+
6	<i>Vatavikara</i>	+	-	-	-	-	+
7	<i>Udarroga</i>	-	+	+	-	-	-
8	<i>Urustambha</i>	-	+	-	-	-	-
9	<i>Svasa</i>	-	+	-	-	-	-
10	<i>Apachi</i>	-	-	+	+	+	-
11	<i>Kasa</i>	-	-	+	+	+	-
12	<i>Sanyasa</i>	-	-	+	-	-	-

13	<i>Kushtha</i>	-	-	+	+	+	-
14	<i>Visarpa</i>	-	-	-	+	+	-
15	<i>Atisara</i>	-	-	-	+	+	-
16	<i>Arsha</i>	-	-	-	+	+	-
17	<i>Shlipada</i>	-	-	-	+	+	-
18	<i>Kamala</i>	-	-	-	+	+	-
19	<i>Mutrakriccha</i>	-	-	+	-	-	-
20	<i>Ajirna</i>	-	-	+	-	-	-

(+:Present; -: Absent)

### 2.3. Epidemiology

In the era of urbanization, obesity has emerged as a serious health issue of both developed and developing nations and recognized as serious public health problems of the 21st century. It is recognized as one of the important lifestyle and metabolic disorders. It is a leading preventable cause of death world over. The incidence of obesity has been felt most dramatically in urban areas and gradually acquires its place in semi-urban and rural areas. WHO has predicted in 1997 that overweight and obesity may soon replace undernutrition and infectious diseases as the most significant cause of poor health. In 2005, WHO estimates that, at least 400 million adults (9.8%) are obese at world map, with higher rates among women than men. Obesity is the main reason for about 80% of type 2 diabetes, about 70% of cardiovascular diseases, and 42% of breast and colon cancers. At present, childhood-obesity is also running out of control. In the past two decades, the number of overweight children and adolescents has doubled.

### 2.4. Aetiology (*hetu*)

Exogenous causes are *Meda* (fat) potentiating diet and regimens, whereas *Dosha*, *Dhatu*, *Mala*, *Srotas* etc. come under the endogenous factors.

### 2.5. Pathogenesis of obesity according to *ayurveda*

In the pathogenesis of *Sthaulya*, all the three *Doshas* are vitiated, especially *KledakaKapha*, *PachakaPitta*, *Samana* and *VyanaVayu* are the *Doshika* factors responsible for the *samprapti* of *Sthaulya*. *Aamaannarasa* traveling in the body channels gets obstructed in the *MedovahaSrotas* owing to the *khavaigunya* due to *bijasvabhava* or *sharirshaithilya* and combines with *kapha* and *meda*, decreasing the *medodhatvagni* which in turn gives rise to augmentation of *meda*. Vitiating *VyanaVayu* propels this augmented *medadhatu* to its sites viz. *Udara* (abdomen), *Sphika* (hip region), *Stana*(breast), *Gala*(neck) etc. resulting in *Sthaulya* or *atiSthula*. *Atisthaulya*(obesity) is considered as one of the eight despicable conditions as described by *AcharyaCharaka*.

**Table 2** Quantifying obesity with body mass index

BMI (kg/m <sup>2</sup> )	Classification	Risk of co morbidities
18.5 – 24.9	Normal range	Negligible
25.0- 29.9	Overweight	Mildly increased
30.0	Obese	Moderate
30.0-39.9	Class 1	
35.0-39.9	Class 2	Severe
> 40	Class 3	Very severe

A person in whom there is excessive accumulation of *Meda*(fat/adipose tissue) and *Mamsa*(flesh/muscle tissue) leading to flabbiness of hips, abdomen, and breast has been categorized as *Atisthula*. *Medasis* body tissue predominant in *Prithvi* and *ApMahabhut* similar to *KaphaDosha*. It is characterized by *Snighdha*(unctuous), *Guru* (heavy), *Sthula*(space occupying), *Picchila*(slimy), *Mridu*(tender/soft) and *Sandra* (dense) *Guna*(qualities). *Sneha*(oleation),

*Sweda*(production of sweat), *Drudhatva*(compactness), and *Asthipushti*(nourishment of bones) are the main functions of *Medodhatu*. Consumption of *Guru* (heavy to digest), *Sheeta*(cold), *Snigdha*(unctuous), *MadhuradiKaphavardhaka*(sweet and *Kapha*increasing) drugs along with lack of exercise and sedentary life style result in excessive nourishment of *Medas*while other bodily elements (*Dhatus*) are deprived of nourishment. Disproportionately increased *Medas*is accountable for several serious consequences reported in *CharakaSamhita*like *Ayuhrasa*(decrease of life span), *Javoparodha*(decrease in enthusiasm and activity), *Krichravayavayata*(difficulty in sexual act), *Dourbalya*(decrease of strength), *Dourgandhya*(bad odor), *Swedabadha*(excess perspiration) and *KshutPipasadhikya*(excessive hunger and thirst). *Mandotsaham*(less activity referring to sedentary lifestyle), *Atisnigdham*(excessive intake of fatty substances), *Atisthauilyam*(gross obesity), and *Mahashanam*(excessive eating) constitute for causation of *Prameha*(urinary diseases including Diabetes) and these etiological factors may also initiate Dyslipidemia.

In *Ayurveda*, Abnormal composition of *Medodhatu* is considered as *Medodosha*&subsequentlyas*Medoroga*. Derangement of *Agni* ordigestive power leads to production of *Ama*, which disturbs *Dhatvagni*of*Medodhatu*& blocks the proper formation of further *Dhatu*. Improperly formed *Medodhatu*accumulates in the body causing *Sthaulyaroga*. Accumulated *Medo*cause disturbance to the action of *Vata*, which cause increased appetite, due to *Chala-Guna*of*Vata*, patients therefore eat more &the entire food is abnormally converted into*Medodhatu*.

## 2.6. Pathyapathya

*Charaka* has mentioned a special type of diet, which is *guru* and *Apatarpana*. It acts in two ways. One is the neutralization of *Vayu* and *Agni* by heaviness of the food, another is non-nourishing of the *Medas* rather it prevents the further formation of fat.

Regarding these properties following diet can be used:

**Table 3** Pathyapathya

Ahara varga	Pathya	Apathya
Shukadhanya	Yava,venuyava,kodrava,nivar,jurna	Godhuma,navanna,shali
Shami dhanya	Mudga,rajmasha,masur,adhaki,kulattha,chanak	Masha,taila
Shakavarga	Vruntak,patrashaka,patila	Madhurashaka,kanda
Phala	Kapitha,jamun,amalaka	Madhrapaha
Dravya	Takra,madhu,ushnodaka, tiltaila, sarshaptaila, arishta, asava.	Dugdha, ikshu,navnit, ghrita.

## 2.7. Guggulu (Commiphora Mukul)

### 2.7.1. Chemical Composition

- **Steroids and sterols:**Guggulosteroneissteroid which exhibits anti-obesity and anti-inflammatory action.
- **Triterpenoids:** Myrrhanone and myrrhanol are the terpenoids that have been reported to trigger anti-inflammatory potential.
- **Sesquiterpenoids:** Cardinene has neuroprotective action.
- **Volatile oils:** Limonine,eugenol,pinene and cineole.
- **Flavonoids:** Quercitin exerts neuroprotective and anti-inflammatory actions.

## 2.8. Therapeutic effects of Guggulu

### 2.8.1. Antihyperlipidemic action

Guggulsterone, the bioactive constituent of Guggul, has been recognized as an antagonist at the nuclear farnesoid x receptor (FXR) is found to be a key transcriptional regulator for the maintenance of cholesterol and bile acid homeostasis, in the body system. It acts against removing excess cholesterol from the body by transforming it to bile acid through from the body. It is observed that treatment by Guggulu significantly increases (57%) bile acid secretion through fecal route.The cholesterol 7 $\alpha$ -hydroxylase (CYP7A1) is other rate limiting enzyme of bile acid synthesis from cholesterol in the liver.

### 2.8.2. Antioxidant action

The overproduction of nitric oxide is closely linked with oxidative stress, that lowers Glutathione, superoxide dismutase (SOD) and increases xanthine oxidase which are associated with the the pathogenesis of hypercholesterolemia, obesity, atherosclerosis and chronic inflammation. It was not until the 1990s when the antioxidant activity of Guggulsterone was first reported. It showed potent inhibitory activity against the production of nitric oxide and therapeutically beneficial to diseases related to the oxidative stress such as obesity etc.

### 2.8.3. Anti-inflammatory action

The anti-inflammatory activity of *Guggul* was documented in *Ayurveda* classics in terms of *Shothaghna* and further reported in 1960, and subsequently in 1977.

### 2.8.4. Fat lowering action

Due to enzyme breakdown property *Guggulu* exerts, it is capable of reducing fat in mice, a study has been conducted.

### 2.8.5. Neuroprotective action

*Guggulu* extract fed to the mice has showed the neuroprotective effect of damaged glia cells.

## 2.9. Cardiotoxic

*Guggulu* reduces drug related heart disease in mice.

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## 3. Discussion

Obesity has become epidemic today and it is essential to understand the consequences of obesity. It is one of the disorders of non-communicable disease, which laid down foundation stone of diabetes mellitus, metabolic syndrome, hypertension and others. In *Ayurveda*, *Sthoulya* and *Medoroga* has been described as obesity. From *samprapti* (Pathogenesis) it is clearly seen that not only does *aharaj* but also *viharaj*, *manas* and *bijdoshaj* factors are associated with the *jathragnimandya* which ultimately results into the accumulation of *medo* and *mamsadhatu*.

Although Charak has explained the complications (updravas) of *sthoulya* if not cared on time, drugs/herbs of antisthoulya property must possess the following characteristics:

- Rasa – tikta, katu, madhura, kashaya
- Guna – laghu, teekshna, snigha, sukshma
- Veerya – ushna
- Vipaka – katu
- Karma – Tridoshashamaka, vedanasthapana, lekshana, shoolahara, shothahara.

Besides, the popular remedial guideline narrated by *Charak* is *guru Apararpan* which appears quite scientific as *guru* acts against reducing *Vayu* and *Agni* and at the same time *Apararpan* is essential to cut off the *MedoDhatu*. So, the treatment aims at decreasing the size of abdomen perse.

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## 4. Conclusion

*Ayurveda* describes the aetiopathology of *Medoroga* (*sthoulya* or obesity), pathogenesis, risk factors, complications and its management. In addition to the dietary regimen, one of the best medications *Guggulu* has tremendous potential to cut off the extra fat. Many researches and studies have been done in this regard in the past, however, the desired result can't be seen among the patients who take it. It might be because the *Guggulu* they use may not be of pure kind. So, it is required to select the best raw herb prior to use it as a medication.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare that there was no conflict of interest regarding the publication of manuscript.

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### Author's short biography



I am working as aAyurved Physician, Panchakarma Specialist since 17 Years. I am a BOARD OF STUDIES MEMBER for ParaclinicalAyurved Board of Maharashtra University of Health Sciences Nashik. I am a FACULTY MEMBER for Post Graduate ParaclinicalAyurved Board of Maharashtra University of Health Sciences, Nashik. I am working as a Research Faculty for Research Methodogy and Medical Statistics of Maharashtra University of Health Sciences, Nashik. I am a Ph.D. GUIDE for five Ph.D. Kayachikitsa( Medicine) students and M.D. GUIDE for 26 M.D. Kayachikitsa (Medicine) students out of which 18 M.D. Kayachikitsa (Medicine) students. My research experience is 14 Years. My research interest in Anxiety Disorder, Diabetes Mellitus, Obesity, Hyperacidity, Diarrhoea, Anaemia etc.