



Role of *Lekhaniya* and *Vachadi gana* in Childhood Obesity - Critical Review

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Abstract

Over the past few decades, obesity has become an increasingly prevalent issue around the world. Increased incidence of obesity in society is a result of poor food, exercise habits and a lack of awareness. Diet, exercise and behavioural modifications form the cornerstone of the therapy. Significant comorbidities have been associated with childhood obesity. The main Ayurvedic texts like *Samhita* and *Nighantu* along with modern texts are referred to collect information on relevant topics. This article is based on a review of various *Ayurvedic* principles and modern concepts related to *Sthaulya vyadhi* and obesity respectively. The description of *Sthaulya vyadhi* mentioned in *Ayurveda* classics is quite similar to obesity. *Ayurveda* management of *Sthaulya* (obesity) is different from contemporary science as it includes *medovaha strotas chikitsa* with dietary modification. Drug pharmacodynamics (*Ayurveda rasa panchaka*) and reported actions on *Lekhaniya* (Scrapping property) drugs to give an idea of the potential of *Ayurveda* to treat the disease efficiently. The potential of *Ayurvedic* drugs for treating obesity is underutilised and this could be a great alternative approach for creating future effective, reliable anti-obesity medications.

Keywords: *Ayurveda*, *Lekhaniya*, Obesity, *Sthaulya*

1. Introduction

Obesity is one of the major health problems, which has been linked to a higher risk of complications in children as well as increased morbidity and mortality in adulthood¹. It is a chronic metabolic condition characterised by increased blood lipid levels and expanded fat mass arising from an imbalance between energy intake and expenditure². It is essential to address the rising prevalence of overweight and obesity in India. Children under the age of five who are overweight (weight-for-height) increased from 2.1% as per NFHS-4 (2015–16) to 3.4% as of NFHS-5 (2019–21). According to the WHO, there were approximately 38.2 million overweight or obese children under the age of five in 2019³. The most used criterion for defining obesity is Body Mass Index (BMI). BMI percentiles are used to describe obesity and overweight in children over the

age of two. Those with a BMI below the 95th percentile are considered obese, while those with a BMI between the 85th and 95th percentiles are considered overweight. A BMI greater than the 99th percentile implicates severe obesity. Childhood obesity is associated with significant comorbidities. Comorbidities include Type 2 diabetes, hypertension, hyperlipidemia, and non-alcoholic fatty liver disease with more acute consequences. The risk of cardiovascular morbidity and mortality is increased by metabolic syndrome, which includes central obesity, hypertension, and hyperlipidemia. Obesity and mental health problems can coexist with each other. Studies have found an association between adolescent depression and obesity⁴. Excessive adiposity in children cannot be properly treated with medicines. The FDA-approved anti-obesity drugs are few and their efficiency remains limited. The gastric lipase inhibitor orlistat is the only medication authorised for use in kids⁵.

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According to *Acharya Charaka*, a *Swastha* (person well built) is someone who has proportionate musculature and a compact body and can withstand cold, hunger, thirst, the sun's heat, and physical exertion. The *Acharya Charaka* narrates "*Ashtau nindita purus*" (the eight types of undesirable persons) with a scientific and detailed description of *atisthaulya*⁶.

Sthaulya is a disease of *medovaha srotas* and the channels that transport the nutrition to the adipose tissues are termed the *medovaha srotas*⁷. *Sneha* (lubrication), *Sweda* (sudation), *Dridhata* (Stabilization of the body parts) and *Asthi pushti* (nourishment of skeletal framework) are the fundamental functions of *Meda.dhatu*⁸. *Atisthaulya* has also been described as *Kapha nanatmaja*⁹ and *Santarpana vyadhi*¹⁰ (Diseases due to excessive nutrition). The pendulous appearance of the *Sphika* (Hip), *Udara* (Abdomen) and *Stana* (Chest) in a person is caused by an excessive increase in the *Meda dhatu*. Lack of enthusiasm concerning body size, and an imbalanced metabolism in a person caused by an excessive increase in the *Mamsa dhatu* is known as *Atisthula*¹¹. Significantly increased *Meda* is responsible for various adverse outcomes such as *Ayushorhas* (Reduced life span), *Javoparodha* (Lack of enthusiasm/activity), *Kruchravayavayata* (Difficulty in sexual intercourse), *Daurbalya* (Fatigue), *Daurgandhya* (Foul body odour), *Swedabadh* (Excessive perspiration), *Atikshudha* (Increase in hunger) and *Atitrushna* (Increase in thirst)¹. These outcomes have been noted in classics. The diseases caused by excessive vitiated *meda dhatu* lead to premonitory symptoms of *Prameha roga*¹³. The leaner person is easier to treat because they are less afflicted than the obese¹⁴. Obesity has mainly two types: constitutional and pathological obesity. Environmental and inherited factors (parental obesity) are the primary contributors to obesity in the majority of children. Increasing stress, faulty dietary habits and decreased awareness regarding exercise are becoming the prominent causative factors for constitutional obesity. Indicators of constitutional obesity include normal growth, a generalised pattern, and a lack of developmental delay or dysmorphism. Pathological obesity is multifactorial. It involves endocrine conditions (Cushing syndrome, growth hormone insufficiency, hypothyroidism), hypothalamic (Brain tumour, head injuries, infection, and radiation following neurosurgery), medicines (Steroid, oestrogen,

and antiepileptic medications), monogenic disorders (Leptin deficiency) and genetic syndromes (Prader-Willi, Beckwith-Wiedemann, Carpenter syndromes)¹⁵.

The lack of exercise, excessive intake of fatty foods and alcoholic drinks, and daytime sleep are the main causes of the affliction of *medovaha srotas*¹⁶. In *Aharatmaka nidana*, the chief associated factors found were, *Ati sampooranat* (Food intake in excess quantity), *Ati guru upayogat* (Excessive consumption of food which is heavy to digest), *Ati madhura upayogat* (Intake of sweet food in excess quantity), *Ati sheet upayogat* (Consumption of Cold or *Sheet veerya dravya* in excess quantity), *Ati snigdha upayogat* (Intake of Excess Unctuous food) and *Adhyashana* (Consuming of food before digestion of previously consumed food). In *Viharatmaka nidana*, *Avyayamat* (Lack of exercise), *Divaswapnat* (Sleeping during day time) and in the *Manasika nidana*, *Ayurvedic* literature explained that the causes of *Sthaulya* include *Harsha-nityatvat* (Always being cheerful), *Achintanat* (Free from tensions and anxieties) etc¹⁷. *Meda* is increased excessively (fat deposit in excess) and it (*meda*) obstructs channels or passages and further results in creating obstacles in the nourishment process of other *dhatu*s (connective tissues of systems in the human body) and *meda* (fat) further continues to deposit in excess, which makes a person quite unable in all the physical activities or body movements in general¹⁸. The examination of the growth

chart is the first step in evaluating a child who is overweight or obese since it provides information on the severity, persistence, and development of obesity. It is important to evaluate the patient's complete history of physical activity, inactivity and dietary recall. The discussion of 24-hour dietary recall, unhealthy eating practices, exercise routines, and screen time is followed by an examination of family eating, nutritional, and activity patterns. Diet and lifestyle play a significant role both in the development and control of obesity. The current treatment of obesity includes increased physical activity and reduced calorie intake. Foods that are high in calories and low in nutrients should only be consumed occasionally as treats. To promote a healthy eating pattern, the food pyramid and the "traffic light approach" to diet may be employed¹⁹.

Acharya Charaka emphasised the course of treatment for *Meda roga* (diseases that occur in vitiated fatty tissue). *Guru* and *Atarpana dravya*

are regarded as a special diet for *Sthaulya*²⁰ good for *Sanshamana* therapy since it has added *Vata shleshma medoharhara* (alleviating *vata kapha* and fatty tissue) qualities²¹. The medications that correct the functioning of *Bhutaagni* and *Dhatvaagni* (*Pachana*) while also acting to lower cholesterol, fat and weight may be suitable for the management of *Sthaulya*. Classics also mention six therapeutic measures (*Shadupakrama*), including one of the *Langhana* (lightning therapy). *Langhana* or reduction therapy, refers to anything that can make the body lighter. One of the measures in *dashavidha langhana* therapy is *Pachana chikitsa* means intake of substance that stimulates digestion. Drugs that stimulate digestive power are dominant in *Vayu* and *Agni mahabhutas* in their composition²². *Acharya Vagbhata* is described in *Shleshma*

upakrama (therapeutic modules for *Kapha dosha*) which is better utilised for the management of obesity. It includes *Anna* (diet) possessing *Ruksha* (dry), *Alpa* (in lesser quantity), *Tikshna* (sharp) and *Ushna* (hot) in properties and *Katu* (pungent), *Tikta* (bitter) and *Kashaya* (astringent) in taste, *Aneka rupa vyayama* (exercise of various types), *Medhoghna aushadha* (fat scrapping drugs), *Nih sukhatvam* (avoiding lavish lifestyle) for *Sukha* (health)²³. The management of obesity involves the use of the *Medohara* and *Lekhaniya* (Anti-obesity and Hypolipidemic) drugs listed in the *Ganas* (group of drugs)^{24,25} of classical texts. The *Rasa-panchaka* (Drug Pharmacodynamics) of herbal drugs which are mentioned in *Lekhaniya* and *Vachadi gana* possess *Lekhana* (scrapping) property as mentioned in Table 1.

Table 1. *Rasa-panchaka* (Ayurvedic Pharmacodynamics) of specific herbal drugs

Sr. No.	Contents	Rasa	Guna	Virya	Vipaka	Doshagnata
1.	<i>Vacha</i> (<i>Acorus calamus</i> Linn.) ²⁶	<i>Katu, Tikta</i>	<i>Laghu, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
2	<i>Daruhridra</i> (<i>Berberis aristata</i> DC) ²⁶	<i>Tikta</i>	<i>Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
3	<i>Nagkeshara</i> (<i>Messua ferrea</i> Linn.) ²⁶	<i>Katu, Tikta, Kashaya</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphahara</i>
4	<i>Kushtha</i> (<i>Saussurea lappa</i> C B. clarke) ²⁷	<i>Katu, Tikta</i>	<i>Laghu</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
5	<i>Haridra</i> (<i>Curcuma longa</i> Linn.) ²⁷	<i>Tikta, Katu</i>	<i>Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Pittahara, Kaphahara</i>
6	<i>Katuki</i> (<i>Picrorhiza kurroa</i> Royle ex Benth.) ²⁷	<i>Tikta, Katu</i>	<i>Laghu</i>	<i>Ushna</i>	<i>Katu</i>	<i>Pittahara</i>
7	<i>Chitraka</i> (<i>Plumbago zeylanica</i> Linn.) ²⁷	<i>Katu</i>	<i>Laghu, Ruksha, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
8	<i>Ativisha</i> (<i>Aconitum heterophyllum</i> Wall.) ²⁷	<i>Katu, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphahara, Pittahara</i>
9	<i>Karanja</i> (<i>Pongamia pinnata</i> Merr.) ²⁷	<i>Katu, Tikta</i>	<i>Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
10	<i>Haritaki</i> (<i>Terminalia chebula</i> Retz.) ²⁷	<i>Kashaya, Katu, Tikta, Amla, Madhura</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Tridosahara</i>
11	<i>Sunthi</i> (<i>Zingiber officinale</i> Roxb.) ²⁷	<i>Katu</i>	<i>Laghu, Snigdha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vatahara, Kaphahara</i>
12	<i>Musta</i> (<i>Cyperus rotundas</i> Linn.) ²⁸	<i>Katu, Tikta, Kashaya</i>	<i>Laghu, Ruksha</i>	<i>Shita</i>	<i>Katu</i>	<i>Pittahara, Kaphahara</i>
13	<i>Haimavati</i> (<i>Iris versicolor</i>) ²⁹	<i>Katu, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>
14	<i>Devdaru</i> (<i>Cedrus deodar</i> Linn.) ³⁰	<i>Tikta</i>	<i>Laghu, Snigdha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara, Kaphahara</i>

2. Discussion

Lekhniya Mahakashaya a combination of 10 drugs having scraping properties and *Vachadi gana* are used therapeutically to treat obesity. It results in various *Karma* (work/activity) like *Dipana* (appetizing)³¹, *Pachana* (digestive)³¹, *Lekhana* (scraping)³¹, and *Amahara* (removal of undigested food) by breaking the *Srotosanga* (obstruction at microchannel level) with *Tikta*, *Katu* and *Kashaya rasa* (nutrients with bitter, pungent, and astringent tastes). It functions at the level of *Agni* (digestive and transforming activities up to the cellular level) and corrects the *Medo dhatvagnimandhya* (incorrect metabolic activities at the level of adipose tissue), as well as slows the development of *Meda sanchaya* (accumulation of adipose and other fatty tissue), by preventing the formation of *Meda dhatu*.

3. Reported Actions of Herbal Drugs

Animals exposed to a High-Fat Diet (HFD) were protected from obesity by the drug *Acorus calamus* Linn. In addition to eliciting weight loss in the treated adipose rats, the β -asarone molecule, which was derived from the rhizome of the *Acorus calamus*, also prevented metabolic changes such as glucose intolerance, high cholesterol levels, and adipokine variation³². *Aconitum heterophyllum* Linn. and *Saussurea lappa* Linn. have higher lipase and amylase inhibitory action, according to in-vitro tests for the treatment of obesity³³. The methanol fraction of *Aconitum heterophyllum* Linn. shows potential hypolipidemic activity by lowering serum levels of T-c, TG, and LDL-c and elevating levels of lipid HDL-c. These findings provide an accurate scientific basis for the use of *A. heterophyllum* Linn. in medication as well as substantial proof for the extract's reported *lekhanitya* effects mentioned in *Charaka Samhita*³⁴. *Curcuma longa* Linn. consists of a promising natural bioactive molecule called curcumin which has anti-obesity properties by promoting lipogenesis³⁵. *Berberis aristata* DC which contains berberine, has the potential to increase insulin secretion, reduce insulin resistance and inhibit adipogenesis. The five metabolic diseases including obesity, T2DM, NAFLD, hyperlipidemia, and gout can all be effectively treated with berberine³⁶.

Several NAFLD criteria, including the lipid content of the liver tissue, the morphological regression of fatty infiltration, the hypolipidemic activity, and the reduction of cholestasis, were regressed by intervention with standardised plant extracts of *P. kurroa* Linn.³⁷. According to the survey, various *Ayurvedic* doctors utilise *Trimada*, a herbal remedy made up of *Mustaka* (*Cyperus rotundus* Linn.) tubers, *Vidanga* (*Embelia ribes* Linn.) fruits, and *Chitraka* (*Plumbago zeylanica* Linn.) roots, to treat obesity³⁸. The extract of *Cyperus rotundus* Linn. possesses anti-adipogenic characteristics that are safe for intake by humans, and efficiently control hypercholesterolemia in overweight people³⁹. The ethanol extract of *T. chebula* Linn. (EETC) inhibits lipogenesis by decreasing the expression of the lipogenic enzyme (FAS) and increasing fatty acid oxidation. The findings reveal the hypolipidemic and anti-obesity potential of EETC in high-fat-fed obese mice⁴⁰. In MSG-induced obese mice, *Cedrus deodara* Linn. extracts reduced serum glucose, total cholesterol, TG, LDL, and VLDL levels and raised HDL. They also showed an antihyperlipidemic and anti-obesity effect⁴¹. These medicinal herbal preparations, which include *Cyperus rotundus* Linn. (*Mustaka*), *Iris versicolor* Linn. (*Haimavati*) and *Holoptelea integrifolia* Linn. (*Chirbilva*), show the lipolytic effect to mobilise fat from adipose tissues in mice, which help to reduce obesity⁴².

4. Conclusion

The most effective approach to treat childhood obesity is with a caloric diet (low-fat and low-calorie food items), regular exercise, and the usage of *Lekhniya* drugs. The diet should be wholesome with sufficient fibre content. Fruits and vegetables should be the foundation of any long-term diet. Healthy food should be included in daily meals consisting of oatmeal, walnuts, salads, bitter gourd (*karela*), drumstick (*shigru*), barley (*yava*), wheat, green gram (*moong dal*), honey (*madhu*), Indian Gooseberry (*amla*), pomegranate (*anar*) and snake gourd, etc. In regulating obesity, drugs with *Tikta rasa* (bitter taste), *Sheetoshna veerya* (hot in potency), *Laghu* and *Ruksha guna* (light and dry qualities), *Katu vipaka*, and *Vata kaphahara* properties are more efficient. *Agni* is the factor responsible for digestion and metabolism and *Medo dhatvagnimandhya* (incorrect metabolic

activities at the level of adipose tissue) plays a vital role in the development of obesity. *Ayurveda* formulations have been shown to offer acceptable anti-obesity effects in addition to antioxidant, hypolipidemic, and insulin-sensitising properties.

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