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## Biochemical Study of Guggul In Case Of Adolescent Obesity

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### Abstract

The 21<sup>st</sup> century, with its continuous changing life styles, environment and dietary habits have made man the victim of many diseases. Obesity is one of the most effective disease which affect someone social, physical and mental features. Data from the National Health and Nutrition Examination survey (NHANES) shows that the percent of the American adult population with obesity (BMI = > 30) has increased from 14.5% to 30.5%. As many as 64% U.S. adults  $\geq$  20 years of age were overweight (defined as BMI > 25) between the years of 1999 to 2000. Extreme obesity (BMI  $\geq$  40) has also increased and effects 4.7% of the population. The increasing prevalence of medically significant obesity raises great concern. Obesity is more common among women than in men; the prevalence in children is also rising at a worrisome rate. Obesity is a precursor to coronary heart disease, high blood pressure, diabetes mellitus and osteoarthritis which have been recognized as the leading killer diseases of the millennium. All these disorders are an indication of the failing systems, their inability to provide optimum performance to keep up the physiological clock ticking. Obesity has been described in *Ayurveda* under heading of *Astanindita Purush*. Etiology pathology and clinical features has been explained along with prognosis and treatment. Guggul as a single drug is giving a significant result in BMI and serum lipid profile.

**Keywords:** Obesity, NHANES, coronary heart disease, diabetes mellitus, osteoarthritis, Astanindita Purush, Guggul

### 1. Introduction

In Ayurveda, Obesity (Sthaulya) has been described by Acharya Charaka as one of the eight despicable persons (Ashtanindita) in the context of the body. The main pathology of Sthaulya is that, there is excessive accumulation of Fat (Medo dhatu) occurs due to various etiology like Adhyashan, excess intake of AtiMadhur, Guru, Snigdha Ahara, Avyayam, Atisampuran, excessive Paya Vikar etc. along with Sharirik Nidanans, Manasik Nidanans like Harshanityatwa, Achintan etc. also play important role in the development of obesity (Sthaulya). In Charak samhita sutras thane, eight features of sthauilya (obesity) are described that are Ayushorhas, Javoparodha, Atikhuda Pipasa, Krichavyavayata, Dourbalya, Dourgandhya, Sweadhadhikya. A very good Chikitsa of Sthauilya (obesity) is also given in Ayurvedic text. After seeing this treatment we will know that our Acharya had given more stress over Prevention along with curable treatment. Many herbal and herbomineral formulations are described for treatment of Obesity.

### Criteria for Assessment of obesity

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health. It is defined by body mass index (BMI) which is closely related to both percentage body fat and total body fat.

### BMI (Body Mass Index)

BMI is calculated by dividing the subject's mass by the square of his or her height i.e.

$$\text{BMI} = \frac{\text{weight in kilograms}}{\text{height in meters}^2}$$

In adults Normal range of Body mass index (BMI) is between 18-25 kg/m<sup>2</sup>. It defines people as overweight (pre-obese) if their BMI is between 25 kg/m<sup>2</sup> and 30 kg/m<sup>2</sup>, and obese when it is greater than 30 kg/m<sup>2</sup>. But in children and adolescents the healthy BMI range varies with the age and sex of the child. The Center for Disease Control defines obesity in children and adolescents as a BMI greater than the 95th percentile for age and sex. Those children and adolescent having BMI between 85<sup>th</sup> -95<sup>th</sup> percentile are defined as overweight.

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## Material Method

For this study 50 patients were selected, Guggul was given to each patient for assessment of its efficacy on obesity (*Sthualya*) for 3 month duration and follow up were taken by 1 month interval. 50 patients were distributed in two groups as follows ;

- Group A:** Patient having BMI more than 25 kg/m<sup>2</sup> were given Guggul.
- Group B:** Patient having BMI more than 25 kg/m<sup>2</sup> were given starch.

**Preparation of Drug-** Alcoholic extract of guggul resin

- Form of Drug-** Drug is to be given orally in capsule form.
- Dose of Drug-** 500mg BD
- Anupan-** Luke warm water

## Diet and Life style

Patients were advised to take their normal diet with less Intake of fatty diet and increase fibrous diet. Patients were asked to continue their normal routine work.

## Criteria of selection of patients

### Inclusion criteria-

- Patient who are willing for trial.
- Patient fulfilling criteria of obesity (BMI>95<sup>th</sup> percentile).
- Adolescents (Age group- 10-19 years).

### Exclusion Criteria

- Patient who are unwilling for trial.
- Patients having any kind of malignancy.
- Patient with drug induced obesity (steroid therapy).
- Patient having Cushing syndrome or any endocrinal cause of obesity.

## Diagnostic criteria for Obesity (*Sthualya*)

### A. Clinical Diagnosis

- Patient having BMI more than 25 kg/m<sup>2</sup>.

- Patient having associated symptoms like *ksudrashwasa*, *Chalaspshik udarstana*, *Alasya*, *Duarbalya*, *Nidradhikya*, *Duargandhya*, *Snigdhangata*, *Atipipasa*, *Atikshudha*, *Alpavyavay*, *Gatrasad*, *Swedadhikya*.

### B. Laboratory Diagnosis

Biochemical investigation : Lipid profile, Serum Cholesterol, serum Triglyceride, Low density Lipoprotein (LDL), High density lipoprotein (HDL), very low Density lipoprotein (VLDL) were evaluated.

## Evaluation parameters for assessment of drug efficacy

### Grading of Obesity by Quetlet's index

BMI is calculated by formula

$$\text{BMI} = \frac{\text{Weight in Kg}}{(\text{Height in meters})^2}$$

The grading of the Obesity was done on the basis of BMI which is recommended by WHO guidelines:

Grade	BMI Range	Comments
0	20 to 24.9	No obese
1	25 to 29.9	Over weight
2	30 to 39.9	Obesity
3	≥ 40.0	Very obese

### Objective parameters

The Lipid profile estimation of every patient was done at pre therapy and post therapy at interval of 1 month for total duration of 3 month. All lipids i.e Total cholesterol, LDL, HDL, VLDL and Triglyceride were estimated and effect drug were assessed.

## Observation & Result

### Effect of Guggul resin and starch on BMI and Lipid Profile of Adolescent obesity

S. No	Symptom	Control				Treated			
		Mean ± SD		T Value	P Value	Mean ± SD		T Value	P Value
		BT	AT			BT	AT		
1	BMI	27.44 ± 1.46	25.28 ± 1.59	17.09	S	27.19 ± 1.35	24.86 ± 1.00	14.09	HS
2	Cholesterol	253.52 ± 32.64	238.56 ± 33.62	5.69	NS	257.36 ± 27.65	237.68 ± 26.33	14.12	HS
3	Triglyceride	255.56 ± 30.88	242.84 ± 31.91	6.95	S	243.08 ± 31.56	233.60 ± 32.99	6.015	HS
4	LDL	138.60 ± 20.16	129.12 ± 21.75	4.382	S	131.00 ± 13.08	124.72 ± 11.97	4.786	HS
5	HDL	34.16 ± 9.83	35.12 ± 8.46	5.75	NS	38.44 ± 13.91	38.60 ± 12.55	0.189	NS

In brief, the present clinical trial reveals that the trial drug *Guggul Resin*, relieves the symptoms of Obesity like *Nidradhikya*, *Dourbalya*, *Alasya* etc. Regarding biochemical parameters also the drug was effective. Noticeable reduction in hyperlipidaemia was observed reducing total cholesterol, serum triglyceride, serum LDL but maintain the level of HDL level in blood.

## Conclusion

Since the Ancient period, the concept of *Sthualya* (obesity) is present in *Ayurvedic* literature. Concept of *Sthualya* (obesity) described in *Ayurvedic classic* can be correlate with obesity (Dyslipidaemias) fo Modern medicine. *Sthualya* (obesity)

mostly manifest in age group of 10 to 15 yrs. Female sex are more prone to develop obesity than male due to various factors like hormonal imbalance, sedentary life style etc. Person living in urban areas are mostly affected. Patient of having sedentary life style are more prone to develop obesity than having physical activity. Middle class are commonly affected mostly upper middle class may be due to increase intake junk food ( high energy products) and reduced physical activity. Person having *Kaphapittaj* and *Tamasik prakriti* are more prone to develop *Sthualyata* (obesity). The trial drug, *Guggule Resin* is usage of herbal formulation and highly significant. By decreasing weight it reduce the BMI ultimately Obesity. By decreasing the Quetlet's index it controls obesity. The trial

drug *Guggule Resin* lowers Serum levels of Cholesterol, Triglyceride and LDL levels. But has no or minimum effect on values of HDL.

Thus on the basis of all above observation we are of the opinion that indigenous drug compound *Guggule Resin* has a good lipid lowering capacity and can be used as lipid lowering agent.

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