

## A Clinical Study on the Effect of *Mahapasmul* Decoction on *Sthaulya* (Overweight and Obesity)

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### Abstract

The present study is a clinical study to evaluate the efficacy of Mahapasmul Decoction (MD) on Sthaulya (Overweight and Obesity). Diagnosed patients (30) were selected from Ayurveda Teaching Hospital at Borella, Sri Lanka from the period of January 2015 to May 2016. Patients who had BMI between 25-40 kg/m<sup>2</sup> were included in the study. Subjective assessment criteria were the symptoms of obesity with proper grading whereas objective criteria were BMI, body circumferences, skin-fold thickness, lipid profile and FBS. Data were analyzed by using SPSS statistical software. In this study, Mahapasmul Decoction was given for eight weeks, at the dose of 120 ml twice a day, before meals with 5 ml bee honey. Mahapasmul Decoction reduced most of the signs and symptoms of obesity, most of the body circumferences, BMI (from 35.30 ± 0.85 to 32.53 ± 0.92), skin fold thickness, triglyceride (from 122.73 ± 1.68 to 126.45 ± 1.10) and fasting blood sugar (from 95.68 ± 1.67 to 91.91 ± 1.54) in statistically highly significant manner ( $p < 0.001$ ) whereas the improvement of excessive thirst, excessive sweating and drowsiness is significant ( $p < 0.05$ ). Collectively, MD is composed of katu (20%), tikta (100%) and kasaya rasa (100%); laghu (100%), ruksha (66.6%) and guru guna (16.6%); ushana virya (66.6%); and katu vipaka (100%). The pharmacodynamic properties of MD reduce kapha and meda and increase agni. Hence, MD is efficacious on promoting digestion and correcting sroto-avarodha. Finally, it is concluded that Mahapasmul Decoction is effective on most of the subjective and objective parameters of Sthaulya (Overweight and Obesity).

**Keywords:** Mahapasmul Decoction; Sthaulya; Obesity; Lipid profile; Fasting blood sugar.

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### Introduction

*Sthaulya* is included under *Ashtau nindita purusha*<sup>1</sup> and diseases of *shleshma nanatmaja*<sup>2</sup>, *samtarpana nimittaja*<sup>3</sup>, *ati-vrimhana*, *nimittaja*<sup>4</sup> and *bahu dosha janita vikara*<sup>5</sup>. Accumulation of fat over the limit led to ill effect in the body known as obesity. Body mass

index (BMI) is an index of weight-for-height that is commonly used to classify overweight and obesity. The World Health Organization (WHO) definition is<sup>6</sup> a BMI greater than 25 is overweight and<sup>7</sup> BMI greater than 30 is obesity. Obesity and overweight occur due to imbalance between calories consumed and calories utilized. Globally, there have been two reasons for overweight and obesity:<sup>7</sup> an increased

intake of energy-dense foods that are high in fat, salt and sugars; and<sup>8</sup> a decrease in physical activity due to the increasingly sedentary nature of many forms of work and increasing urbanization. Overweight and obesity are the fifth leading risk for global deaths. At least, 2.8 million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity. Overall, more than one in ten of the world's adult population is obese.<sup>8</sup> In addition to increased future risks, obese persons experience breathing difficulties, increased risk of fractures, hypertension, cardiovascular diseases and psychological effects.<sup>9</sup>

*Sthaulya* is caused by unhealthy dietary and lifestyle factors and it is well correlated with overweight and obesity. Ayurveda possesses a number of valuable remedies that can be used in the management of *Sthaulya*.

### Justification

Obesity is one of the burning problems globally as it hamper the different systems in the body. An obese person is prone to land up in complications like dyslipidemia, hypertension, coronary heart diseases, diabetes mellitus, osteoarthritis, infertility, impotency and many psychological. Ayurveda is one of the highly developed indigenous systems of medicine in the world. The classical *Mahapasmul* Decoction had not been subjected to any scientific study to evaluate its efficacy on *Sthaulya*.

### Objectives

This study was carried out evaluate the efficacy of *Mahapasmul* Decoction on *Sthoulya* (Overweight and obesity).

### Materials and Methods

The present study is a clinical study in which patients who fulfilled the criteria were selected from Ayurveda Teaching Hospital at Borella, Colombo 08, Sri Lanka from period of January 2015 to May 2016. Both male and female patients, between the age of 20 and 60, who had BMI between 25 - 40 kg/m<sup>2</sup> were included in the study. Thirty (30) patients were treated with *Mahapasmul* Decoction at the dose of 120 ml at 8.00 a.m and 6.00 p.m before meals with 5 ml bee honey for a period of eight (08) weeks.

Patients were evaluated before starting the treatment and after completing the treatment for their subjective as well as objective criteria. Subjective criteria (signs and symptoms of *sthaulya*) were assessed with proper grading according to their severity. Objective assessment criteria were BMI, body circumferences, skin-fold thickness, lipid profile and FBS.<sup>10</sup> Specific diet was recommended to each patient during the period of treatment.

Data were analyzed by SPSS statistical software. Qualitative data were analyzed by Wilcoxon Sign Rank test and Mann-Whitney test whereas quantitative data were analyzed by paired and unpaired 't' tests.

### Results and Observations

Majority of patients were in 40–49 age group (58.37%), female (95.33%), married (95.33%), housewife (77.7%), had secondary education (79.3%), belonged to middle socio-economic status (76.7%), and lived in suburban areas (67.8%). Considering the family history, obesity and type II DM were among sisters (52.7%), mother (48.3%) and father (30.0%).

The majority of patients had mixed diet (90%); *adhyasana* (56.3%), *vishamasana* (46.7%) and *viruddhasana* (35%); food rich in *snigdha* (75.3%) and *guruguna* (72.0%); *madhurarasa* (59.3%); and *visamagni* (63.3%). Considering the lifestyle, the majority of patients had no exercise (65.3%), had excessive sleep (51.7%) and day sleep (39.7%). *Vata-kapha prakriti* (59.3%) were more common among *sthaulya* patients. Almost all patients had *avara* state of *abhyavarana shakti* and *avara jarana shakti* (each 100%).

### Effect of *Mahapasmul* Decoction on *Sthaulya*

The improvement of the mean value of *sphik-chalata* (from 3.65 to 3.04), *anga-gaurava* (from 3.39 to 2.50), *anga-daurgandyata* (from 3.67 to 2.46), *ati-kshudha* (from 2.00 to 0.40), *daurbalya* (from 3.35 to 2.41), *gathra-sada* (from 3.37 to 2.53), *udara-chalata* (from 3.36 to 2.69) and *sthana-chalata* (from 3.56 to 2.84) was statistically highly significant (p<0.001). The improvement of the mean value of *ati-trisha* (from 3.55 to 2.55), *seweda-abadha* (from 3.28 to 2.56), *utsaha-hani* (from 3.40 to 2.80), *swasa* (from 3.60 to 2.60) and *nidradikya* (from 3.57 to 2.64) was statistically significant (p<0.05).

MD reduced the mean value of mid arm circumference, waist circumference and hip circumference in statistically highly significant

**Table 1:** Effect of *Mhapasmul* Decoction on body circumferences

Parameter	Mean		SD ± SE		t	p
	BT	AT	BT	AT		
Mid arm circumference	34.65	32.47	4.05 ± 0.74	3.83 ± 0.70	4.43	p<0.001
Waist circumference	103.97	98.98	11.74 ± 2.14	11.87 ± 2.16	8.34	p<0.001
Hip circumference	111.84	106.84	12.21 ± 2.23	13.18 ± 2.40	9.27	p<0.001

**Table 2:** Effect of *Mahapasmul* Decoction on Lipid Profile and Fasting Blood Sugar

Parameter	Mean		SD ± SE		t	p
	BT	AT	BT	AT		
Total cholesterol	221.06	205.19	59.82 ± 10.92	54.82 ± 9.89	0.10	p>0.05
Triglyceride	122.73	126.45	9.23 ± 1.68	6.06 ± 1.10	4.80	p<0.001
LDL	144.10	123.80	32.34 ± 5.90	40.58 ± 7.40	3.33	p<0.05
HDL	52.97	52.85	28.54 ± 5.21	21.53 ± 3.93	-0.67	p>0.05
FBS	95.68	91.91	9.19 ± 1.67	8.14 ± 1.54	4.59	p<0.001

**Table 3:** Effect of *Mhapasmul* decoction on Skin Fold Thickness of *Sthaulya*

Skin fold thickness over	Mean		SD ± SE		t	p
	BT	AT	BT	AT		
Biceps	24.70	22.80	8.91 ± 1.62	8.82 ± 1.61	1.41	p<0.001
Triceps	24.07	21.20	5.33 ± 0.97	4.75 ± 0.86	1.92	p<0.001
Supra iliac region	41.13	39.13	5.36 ± 0.97	5.66 ± 1.03	1.53	p<0.001
Mid-thigh	42.30	39.87	4.04 ± 0.73	4.93 ± 0.90	1.47	p<0.001
Umbilical region	39.93	38.07	5.21 ± 0.95	4.95 ± 0.90	1.32	p<0.001

manner ( $p<0.001$ ). The reduction of the mean value of BMI, skin fold thickness over middle portion of the biceps, triceps, supra iliac region, mid-thigh and umbilical region was statistically highly significant ( $p<0.001$ ) (Table 1).

MD reduced triglyceride and fasting blood sugar which is statistically highly significant ( $p<0.001$ ) whereas the reduction of LDL was statistically significant ( $p<0.05$ ). The reduction of mean value of total cholesterol and increase of HDL was insignificant ( $p>0.05$ ) (Table 2).

MD reduced skin fold thickness over middle portion of biceps, triceps, supra iliac region, mid-thigh and umbilical region in statistically highly significant manner ( $p<0.001$ ) (Table 3).

## Discussion

In this study, collectively, 80% of patients belong to the age group of 30–49 meaning young adults and middle-aged people are more prone to have obesity. The majority of *sthaulya* patients are female (93.33%). According to a study conducted by AI-Isa AN- Prevalence of obesity among adult Kuwaitis: a cross-sectional study, it has been reported that obesity (BMI  $\geq 30.0$ ) is, at present, estimated to be about 40.6% in adult females are obese.<sup>11</sup> Hence, it is evident that females are more vulnerable to develop obesity. The majority of patients are married (93.3%), housewives (76.7%),

having secondary education (78.3%), belonging to middle socio-economic status (86.7%) and living in suburban areas (66.7%). The majority of the patients are having gradual onset (98.3%). Considering the family history, obesity is common among sisters (41.7%) and mothers (38.3%).

Considering the psychological history, this study reports that majority of the obesity patient having tension (45%) which may be due to the effect of disease. Among female patients, the majority of patients are having regular menstrual cycle (53.6%). The majority of patients are having mixed diet (90%) than the people who take vegetarian diet (10%). Excessive consumption of animal products rich in fat and oil is well established risk factor of obesity.

The majority of patients are having *adhyasana* (53.3%) which is a causative factor of *santarpana janita vyadhi*.<sup>3</sup> Obesity is among *santarpana janita vyadhi*. Majority of patients are having *visamagni* (53.3%) and *tikshanagni* (46.7%). The former is due to *vataprakopa* resulting in *sroto-avardha* in the pathogenesis of *sthaulya*. The majority of patients have *madhyakoshta* (48.3%) and regular bowel habit (53.3%).

The majority of patients have no exercise (68.3%), have excessive sleep (100%) and day-sleep (61.7%). As a *santarpanajanitavuadhi*, sedentary lifestyle is one of causative factors of *sthaulya*. The 73.3% of patients are having food rich in *Snigdha guna* (73.3%), *ati-guru* (70.0%) and *ati-madhura* (58.3%)

which increase *medo-dhatu* resulting obesity. In this study it is revealed that *Sthaulya* is more common among *vata-kapha prakriti* (58.3%) indicating this type of *prakriti* is more prone to obesity.

Almost all patients had *avara* state of *abhyavarana shakti* (100%) and *jaranashakti* (100%). As stated in the pathogenesis, *sthaulya* is associated with increased appetite (*abhyavaharanashakti*) and decreased digestion specially in the latter parts of formation of *dhatu* (*jarana shakti*).

#### Discussion on the effect of *Mahapasmul* Decoction

*Mahapasmul* Decoction improved *sphik chalata*, *anga gaurava*, *anga daurgandaya*, *ati kshudha*, *daurbalya*, *gatraseda*, *udara chalata*, *sthana chalata*, mid arm circumference, waist circumference, hip circumference, BMI, skin fold thickness over middle portion of the biceps, triceps, supra iliac region, mid-thigh and umbilical region, triglyceride and fasting blood sugar is statistically highly significant ( $p < 0.001$ ).

*Mahapasmul* Decoction is composed of *katu* (20%), *tikta* (100%) and *kashaya rasa* (100%); *laghu* (100%), *ruksha* (66.6%) and *guru guna* (16.6%); *ushana virya* (66.6%); and *katuvipaka* (100%). *Bilva* is having *tridosagna*, *vatagna*, anti-diabetic, *sotahara*, *dipana* and *pachana* properties. *Agnimantha* has *kaphaghna*, *vataghna*, *dipana*, *anulomana*, *pramehaghna* and *sothahara* properties. *Shyonaka* is known to have anti-inflammatory and diuretic effects. *Kashmarya* has anti-diabetic, anti-aging, analgesic, diuretic and hepato-protective. *Patala* is having *tridosahara*, *vatakapha-shamaka*, diuretic, anti-inflammatory, *agni-dipaka*, *yakrut uttejaka*, *mutrala*, *sweda utpadaka* properties. *Makshika* (bee honey) is of *tridosaghna*, *kapha pitta shamaka*, anti-inflammatory and antioxidant properties. Collectively, the pharmacodynamic properties of *Mahapasmul* Decoction reduce *kapha* and *meda* and increase *agni*. Hence, *Mahapasmul* Decoction is responsible for promoting digestion and correcting *sroto-avarodha*. Due to these pharmacodynamic properties, *Mahapasmul* Decoction improves most of the subjective as well as objective parameters of *Sthaulya* significantly.

#### Conclusion

By foregoing, it is evident that *Mahapasmul* Decoction is effective in reducing most of the subjective as well as objective parameters of *Sthaulya*. The

mode of action of MD has been explained based on its pharmacodynamic properties such as *rasa*, *guna* and *vipaka*, etc. Its mode of action should be further studied by scientific researches. Finally, it is suggested that these findings need to be validated by further research having more number of patients with longer duration of treatment.

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