



RANDOMIZED CONTROLLED CLINICAL TRIAL OF ADD ON EFFECT OF PIPPALI ON GUDUCHI BHADRAMUSTA CHURNA IN MANAGEMENT OF STHOULYA (OBESITY)

ANKITA J. KALEL^{1*}, SADANANAD V. DESHPANDE²

^{1*}M.D. Scholar, Kayachikitsa, Tilak Ayurved Mahavidyalaya, Pune

²Prof and HOD, Department of Kayachikitsa, Tilak Ayurved Mahavidyalaya, Pune.

Corresponding Author Email: ankitakalel95@gmail.com Access this article online: <https://jahm.co.in>

Published by Atreya Ayurveda Publications under the license CC-by-NC-SA 4.0

Submitted on- 17-03-24

Revised on- 25-05-24

Accepted on-27-05-24

ABSTRACT:

Background: The global prevalence of obesity is escalating due to lifestyle changes characterized by increased intake of high-fat, high-carbohydrate foods coupled with decreased physical activity, particularly evident in rapidly industrializing Asian nations. Ayurveda, describes *Sthoulya* (obesity) as a disorder involving abnormal increase in *meda dhatu* (fatty tissue), primarily influenced by imbalances in *Kapha*, *Vata*, and *Meda* (fatty tissue). These insights underscore the potential of Ayurveda in addressing the global burden of obesity while adhering to contextual needs and global standards. This randomized controlled clinical trial investigated the supplementary effects of *Pippali* when combined with *Guduchi Bhadramusta Churna* for managing obesity. **Materials and method:** Fifty participants were divided into two groups: Group A received *Pippali* with *Guduchi Bhadramusta Churna* along with *Anupana*(medium) *Madhu*(honey), while Group B received *Guduchi Bhadramusta Churna* with *Anupana Madhu* alone. **Result:** Patients were evaluated using both subjective and objective criteria, and outcomes were analysed based on the observed results. **Discussion:** This study sheds light on the potential synergistic benefits of incorporating *Pippali* into the treatment regimen of *Guduchi Bhadramusta Churna* for obesity management, offering valuable insights into Ayurvedic approaches to addressing this widespread health concern.

Keywords: *Sthoulya*, *Pippali*, *Gudduchi*, *Bhadramusta*, Randomized controlled clinical trial

INTRODUCTION:

Obesity, characterized by abnormal or excessive fat accumulation, poses a significant health threat globally, particularly in industrialized nations where its prevalence is rapidly escalating^[1]. This rise is attributed to shifts in dietary patterns towards high-fat, high-carbohydrate foods, coupled with increasingly sedentary lifestyles, exemplified by the obesity epidemics witnessed in various Asian countries. The confluence of fast-paced industrialization and economic growth has led to a surge in sedentary occupations and a shift in dietary habits, marked by increased consumption of sugar and fat and decreased intake of cereals. Consequently, obesity is associated with an elevated risk of numerous health complications, including hypertension, type 2 diabetes, non-alcoholic fatty liver disease, joint pain, and certain malignancies, with the severity escalating with Body Mass Index (BMI)^[2]. Despite various treatment modalities proposed, such as surgical liposuction, their efficacy is limited and often marred by complications, underscoring the urgent need for more effective interventions. Ayurveda delineates *Sthoulya*, its term for obesity, as a disorder characterized by an abnormal increase in *meda dhatu* (fatty tissue), predominantly influenced by imbalances in *Kapha*, *Vata*, and *Meda*^[3]. Patients with *Sthoulya* exhibit distinctive characteristics, including excessive appetite, rapid digestion, sluggishness, and disrupted digestive function leading to predominant *Meda*

Dhatu accumulation. The term *Sthoulya* is derived from the root "Stu" and the suffix "Ach"^[4]. The word literally means "bulk, solid, or weighing substance". *Atisthula* refers to an individual exhibiting a pendulous appearance characterized by excessive accumulation of fat tissue along with *mamsa dhatu* (muscle tissue) in the regions of the *sphik* (thighs), *udara* (abdomen), and *stana* (breasts). This condition is marked by an uneven and abnormal distribution of fat, leading to a disproportionate and bulging physique. Additionally, *Atisthula* individuals often display reduced enthusiasm or vigor, reflecting a state of diminished vitality or energy. *Acharya Charaka* has mentioned *Guru* (heavy), *Madhura* (sweet), *Avyayama*, (lack of exercise), *Divaswapna* (sleeping during daytime) as the causative factors for *Sthoulya*^[5]. *Acharya Sushrut* explains *Rasa dhatu* (first formed digestive juice) is necessary for '*sthoulya*'. *Sthoulya* is caused by the qualities of *ahara rasa* (digestive juice), which increase *kapha* and *meda*^[6]. These qualities include *Madhura rasa*, *Guru*, *Sheeta* (cold), *Snigdha* (soft), *Sheeta Virya*, *Madhura Vipaka*. *Charaka* has narrated Cardinal Symptoms, eight disabilities of *Sthoulya* are *Ayushahrassa* (Diminution of life span), *Javoparodha* (Lack of Speed), *Krucrrha Vyavaya* (Difficulty in Sexual act), *Daurbalya* (General Debility), *Daurgandhya* (Fouls smelling of body), *Swedabadha* (Distressful Sweating), *Kshudhaatimatra* (Excessive Hunger), *Pipasaatiyoga* (Excessive Thirst)^[7]. Given the significant morbidity associated with

obesity and the limited success of conventional treatments, there is a pressing need to explore alternative therapeutic approaches, including those offered by Ayurveda. However, to garner broader acceptance and integration into mainstream healthcare, Ayurvedic interventions must undergo rigorous scientific scrutiny. Thus, this study endeavours to investigate the therapeutic potential of *Pippali* with *Guduchi Bhadramusta Churna* in managing *Sthoulya* through a randomized controlled clinical trial. By adhering to internationally recognized protocols and criteria, this study aims to contribute to the growing body of evidence supporting the efficacy and safety of Ayurvedic interventions in addressing the global burden of obesity.

OBJECTIVES:

Assess the efficacy of *Pippali* with *Guduchi Bhadramusta churna* in management of *Sthoulya*.

Secondary Objective:

MATERIAL AND METHODS:

Study design:

Randomized controlled trial.

Study setting:

Cases were selected from the OPD and ward of hospital attached to concerned institute.

Cases attending *Kayachikitsa*(Medicine) OPD and IPD setup of Department of *Kayachikitsa* of Tarachand Ramnath Dharmarth Ayurvedic Rugnalaya, Pune

Source Population:

Patients attending *Kayachikitsa* OPD and IPD with manifestation of *Sthoulya* were screened and those fulfilling the inclusion criteria are recruited for the study between January 2023 to December 2023.

Method of selection of study subject:

50 Patients of *Sthoulya*, fulfilling the inclusive criteria had been taken randomly and divided into 2 groups by Lottery Method of selection.

Group A (Trial Group) 25 Patients

Pippali Guduchi Bhadramusta churna with *madhu* as *anupan*.

Group B (Control Group) 25 patients

Guduchi Bhadramusta churna with *madhu* as *anupan*.

Follow up study was done on 0, 30, 60, 90day

Inclusion criteria

1. Patients having signs and symptoms of *Sthoulya*
2. Patients of Age Group: 18years to 40years.
3. Patients of any sex, religion, and socioeconomic status.
4. Fresh and treated cases.
5. Patients with BMI Between 25kg/m² to 39 kg/m².

Exclusion criteria

1. Patients age less than 18 and more than 40 years.
2. Pathophysiology or genetic syndromes associated with *sthoulya*.
3. Malignancy, poorly controlled DM, HTN.
4. Patient having other acute complicated system disease

5. Symptomatic patient with clinical evidence of heart failure.
6. Intake of the counter weight loss agents, centrally acting appetite suppressants.
7. Alcoholic and drug abusers, Pregnant and lactating women.

Withdrawal criteria:

1. Occurrence of serious adverse events.
2. The investigator feels that the protocol has been violated/ patient becomes uncooperative.
3. The patient is not willing to continue the trial/to follow the assessment schedule.

Sampling technique:

Random allocation method.

Sample size:

50 (Using Cochran formula at 95% confidence interval, 5% precision level and 0.5% estimated proportion), fixed to be 50 with 10% dropout rates.

Divided equally into -Group A -25 Patients, Group B -25 Patients

Randomisation: by lottery method

Ethical consideration:

1. NOC of superintendent of Institute was taken to conduct the clinical study.
2. Informed written consent of patients was taken prior to the initiation of the study.

The trial was registered under CTRI/2022/12/048543

Table No: 1-Trial intervention: group A drug

Drug	<i>Pippali with Guduchi Bhadramusta churna</i>
Dose	4gm TDS

<i>Anupana</i>	<i>Madhu</i> 8gm (approx. 6 ml)
Duration	90 days
Follow up	30,60,90 th day
Route of Administration	Oral

Table No :2-Group B Drug

Drug	<i>Guduchi Bhadramusta churna</i>
Dose	4 gm TDS
<i>Anupana</i>	<i>Madhu</i> 8gm (approx. 6 ml)
Duration	90 days
Follow up	30,60,90 th day
Route of Administration	Oral

Preparation of Drug (SOP of Drug):

Group A(Trail):

Raw material *Pippali*(fruit), *Guduchi*(stem) , *Bhadramusta*(root) were taken from standardized GMP certified company.

All the ingredients were taken in equal quantity in a fine powder form and mixed well.

Group B(Control):

Raw material *Guduchi*(stem), *Bhadramusta*(root) were taken from standardized GMP certified company.

All the ingredients were taken in equal quantity in a fine powder form and mixed well.

Madhu was used as *anupana* for both groups standardization of which was done.

Monitoring

Patients were called at every 30 days interval and period assessment was done once in a month to note the changes observed during the period of trial. Total period of trial 3 months.

Assessment criteria:

1. Subjective criteria: Signs and symptoms of *Sthoulya*

2. Objective criteria: 1) Body mass index (BMI)

2) Waist Hip Ratio (WHR)

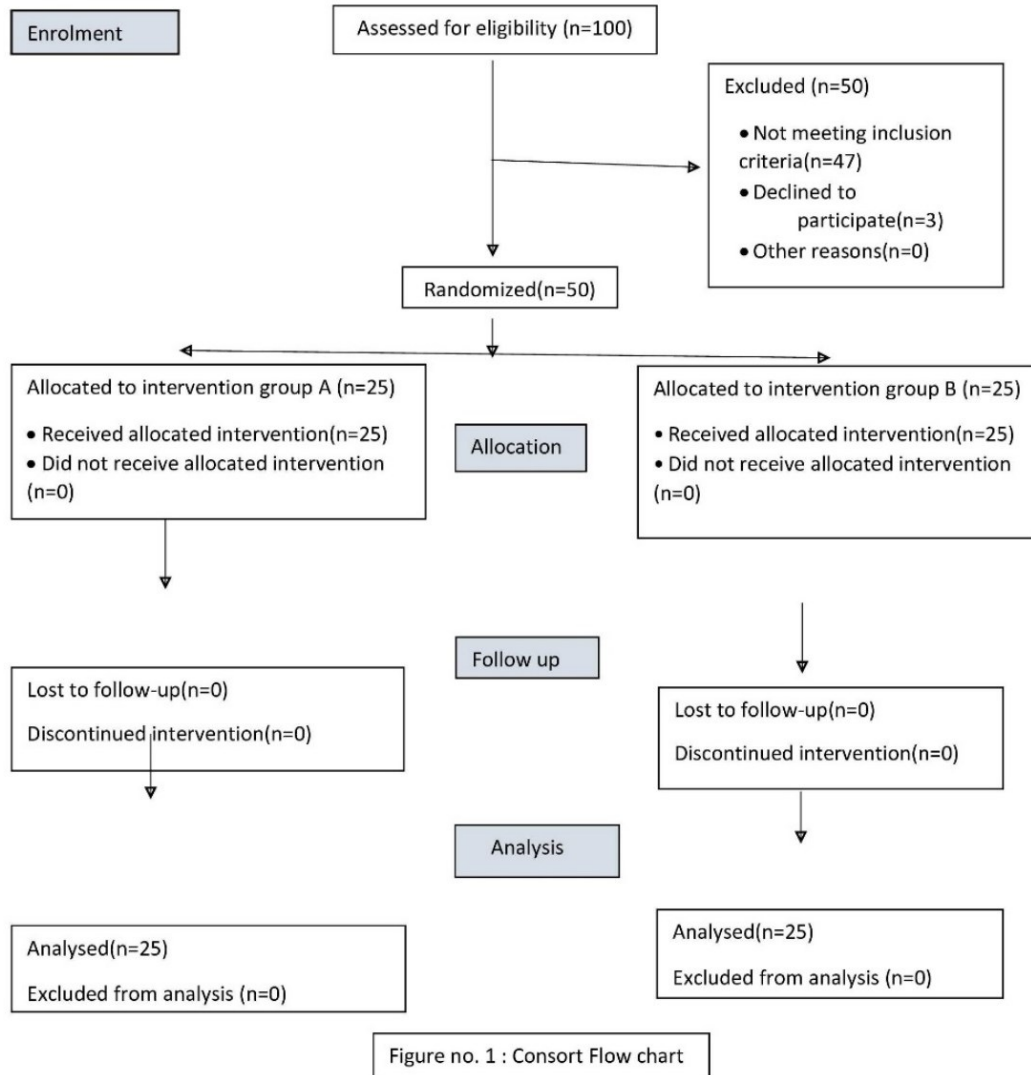
Outcomes:

Primary outcome:

Reduction in both subjective as well as objective criteria of *Sthoulya*

Secondary outcome:

Improvement in the quality of life.



Data Presentation: The information collected during the clinical trial underwent sorting and further processing, culminating in its presentation in tabular form. This included general observations such as age, gender, and religion, followed by an evaluation of therapy outcomes based on improvements noted in

signs and symptoms, BMI, Waist circumference, Hip Circumference, WHR.

Statistical Analysis: The gathered data on various parameters underwent statistical analysis, involving the calculation of Mean, Standard Deviation, and Standard Error (SE).

Observation and Result:

Subjective Criteria: Statistical analysis of signed rank test.
subjective parameters was done using wilcoxon

Table no.3: Comparison between group a (trial) and group b (control) using Mann-Whitney U test

Variable	Group	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-Value
Kruchravavyata (loss of libido)	Trial Group A	25	28.0	700.0	250.000	0.0436573
	Control Group B	25	23.0	575.0		
	Total	50				
Angagandha (Body Odour)	Trial Group A	25	33.34	833.50	116.500	0.0000293
	Control Group B	25	17.66	441.50		
	Total	50				
Swedadhikya (perspiration)	Trial Group A	25	31.74	793.50	156.500	0.0003698
	Control Group B	25	19.26	481.50		
	Total	50				
Kshudaadhikya (increased appetite)	Trial Group A	25	31.70	792.50	157.500	0.0003766
	Control Group B	25	19.30	482.50		
	Total	50				
Nidraadhikya (increased sleep)	Trial Group A	25	32.50	812.50	137.500	0.0000786
	Control Group B	25	18.50	462.50		
	Total	50				
Chala Spik-Udar Stana (moving hips belly and breast)	Trial Group A	25	37.00	925.00	25.000	0.0000001
	Control Group B	25	14.00	350.00		
	Total	50				

Mann Whitney U Test is carried out for comparison between Group A and Group B. From above table, we can observe that, P-Value for almost parameters is less than 0.05. Hence, we can conclude that, there is significant difference between Group A and Group

B.Further we can observe that, mean rank for Group A (Trial) is greater than Group B (Control). Hence, we can conclude that, effect observed in Group A (Trial) is better than Group B (Control).

Objective criteria: Analysis of subjective parameters was done using paired test.

Table No. 4: Comparison between group a (trial) and group b (control) using unpaired t-test

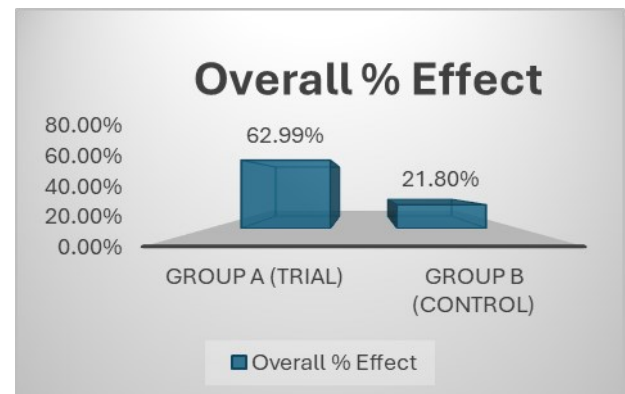
Variable	Group	N	Mean Diff	SD	SE	t-Value	P-Value	Result
Weight	Group A (Trial)	25	4.84	2.09	0.42	8.500	0.000000 00004	Sig

	Group B (Control)	25	1.17	0.53	0.11			
BMI	Group A (Trial)	25	2.00	0.89	0.18	8.200	0.00000 000011	Sig
	Group B (Control)	25	0.50	0.22	0.04			
Waist Circum- ference	Group A (Trial)	25	2.15	0.90	0.18	10.143	0.000000 000000	Sig
	Group B (Control)	25	0.26	0.21	0.04			
Hip circum- ference	Group A (Trial)	25	1.10	0.58	0.12	7.981	0.000000 00024	Sig
	Group B (Control)	25	0.14	0.14	0.03			
Waist-Hip Ratio	Group A (Trial)	25	0.01	0.01	0.00	7.293	0.00000 000262	Sig
	Group B (Control)	25	0.00	0.00	0.00			

Unpaired t- Test is carried out for comparison between Group A and Group B. From above table, we can observe that, P-Value for almost parameters is less than 0.05. Hence, we can conclude that, there is significant difference between Group A and Group B. Further we can observe that, mean difference for Group A (Trial) is greater than Group B (Control). Hence, we can conclude that, effect observed in Group A (Trial) is better than Group B (Control)

Table No. 5: Overall % effect:

	Group A (Trial)	Group B (Control)
Overall % Effect	62.99%	21.80%



Graph No.1: Overall % Effect

RESULT:

•In the present study, in trial group A, received *Pippali Guduchi Bhadramusta churna* with *madhu* as *anupan* had got relief in symptoms *Kruchravavyata* by 50%, *Angagandha* by 67.50%, *Swedadhikya* by 50%, *Kshudhadhikya* by 69.70%, *Nidradhikya* 51.43%, *Chala Spik-Udar stana* by 39.34%, Weight by 6.19%, BMI by

6.16%, Waist circumference by 2.27%, Hip circumference by 1.06% and WHR by 1.23%.

•Whereas, effect of *Guduchi Bhadramusta churna* with *madhu* as *anupan* in symptoms *Kruchravavyata* by 33.33%, *Angagandha* by 24.14%, *Swedadhikya* by 26.83%, *Kshudhadhikya* by 29.41%, *Nidradhikya* 14.29%, *Chala Spik-Udar stana* by 2.78%, Weight by 1.56%, BMI by 1.65%, Waist circumference by 0.28%, Hip circumference by 0.14% and WHR by 0.13%.

DISCUSSION

Discussion part is divided into the following parts:

1.Disease aspect

2.Demographic data

3.Observations in the present study.

- Effect of therapy on quantitative parameters.

- Effect of therapy on qualitative parameters.

4.Probable mode of action of drug

1)Discussion on disease aspect:

Contemporary lifestyle alterations and erratic, unhealthy eating patterns are major culprits behind the onset of diseases. Obesity, known as *Sthoulya* in Ayurveda, stands out as a significant issue in modern society, particularly impacting the younger demographic. Given its considerable clinical importance and widespread occurrence, there's a pressing necessity to discover an efficient treatment. Therefore, a collective endeavour to address this ailment using Ayurvedic remedies is imperative to aid those affected.

2) Discussion on demographic data:

1.Age:

In this study, the majority of the patients were between the ages of 31- 40 years. So, it is clear that the majority of *Sthoulya* patients are middle-aged.

2.Gender:

In the current study, the majority of patients 28(56%) were female, whereas 22 (44%) were male. It is a well-known and scientifically proven truth that the female sex is more susceptible to this condition, either due to hormonal changes during menopause or due to their routine/dietary habits, and this fact may be confirmed in this study as well.

3.Religion:

According to religious distribution, the majority of patients, 45 (90%), were Hindus, while 5 (10%) were Muslims. The religion does not appear to have a major association with the disease *Sthoulya*. As a result, the geographical distribution of Hindus in the city may account for the greater occurrence in Hindus.

4.Type of work:

In the manifestation of obesity(*sthoulya*) type of work plays an important role. In the present study 32% of patients were Housewife, 28% were workers,14% of patients were doing business and 12% of patients were doing service work ,6%were teacher,6% Student,2% other work. Obesity in active workers was mostly caused by job stress. Sedentary people are more likely to develop the condition.

6.Diet:

Based on the observations, the majority of patients, 41(82%), were on a mix diet, with the remainder 9(18%) on a vegetarian diet. Those who ate a diversified diet were most affected.

3)Observations in the present study:

A.Effect of therapy on qualitative parameters-

Statistical Analysis of Subjective Parameters
Using Wilcoxon signed Rank Test

1.Changes in *Kruchravayavata* in Group A(Trial) and Group B(Control):

On score scale 50% relief was seen in Group A
33.33% relief was seen in Group B.

2.Changes in *Angagandha* in Group A(Trial) and Group B(Control):

On score scale 67.50% relief was seen in Group A

24.14% relief was seen in Group B.

3.Changes in *Swedadhikya* in Group A(Trial) and Group B(Control):

On score scale 50% relief was seen in Group A
26.83% relief was seen in Group B.

4.Changes in *Kshudaadhikya* in Group A(Trial) and Group B(Control):

On score scale 69.70% relief was seen in Group A

29.41% relief was seen in Group B.

5.Changes in *Nidradhikya* in Group A(Trial) and Group B(Control):

On score scale 51.43 % relief was seen in Group A

14.29% relief was seen in Group B.

6.Changes in *Chala Spik Udar Stana* in Group A(Trial) and Group B(Control):

On score scale 39.34 % relief was seen in Group A

2.78% relief was seen in Group B.

•Mann Whitney U Test is carried out for comparison between Group A and Group B. From above we can observe that, P-Value for almost parameters is less than 0.05.

•Hence, we can conclude that, there is significant difference between Group A and Group B.

•Further we can observe that, mean rank for Group A (Trial) is greater than Group B (Control).

•Hence, we can conclude that, effect observed in Group A (Trial) is better than Group B(Control).

B.Effect of therapy on quantitative parameters-

Statistical Analysis of Subjective Parameters
Using Paired Test

1.Weight:

Group A(Trial)has shown 6.19% decrease in the body weight where as in group B(Control)1.56% was found.

2.Body Mass Index (BMI):

Group A(Trial)has shown 6.16% decrease in the body weight where as in group B(Control)1.65% was found.

3.Waist Circumference:

Group A(Trial)has shown 2.27% decrease in the body weight where as in group B (Control)0.28% was found.

4.Hip Circumference:

Group A(Trial)has shown 1.06% decrease in the body weight where as in group B (Control)0.14% was found.

5.Waist Hip Ratio: Group A(Trial)has shown 1.23% decrease in the body weight where as in group B (Control)0.13% was found.

- Unpaired t- Test is carried out for comparison between Group A and Group B.
- we can observe that, P-Value for almost parameters is less than 0.05. Hence, we can conclude that, there is significant difference between Group A and Group B.

4)Probable mode of action of interventions:

Table no.6: Rasa, Virya and Vipaka

Name	Latin name	Ras	Virya	Vipaka
<i>Pippali</i>	<i>Piper longum</i>	<i>Katu</i>	<i>Ushna</i>	<i>Madhur</i>
<i>Guduchi</i>	<i>Tinospora cordifolia</i>	<i>Tikta ,katu,kashay</i>	<i>Ushna</i>	<i>Madhur</i>
<i>Bhadramusta</i>	<i>Cyperus rotundus</i>	<i>Tikta ,kashay,katu</i>	<i>Sheet</i>	<i>Katu</i>

Following shows individual properties of the drugs used which facilitates reduction in signs and symptoms of Sthoulya.^[8]

Pippali:

Pippali may impact obesity by following ways: Metabolism Boost, Digestive Aid, Appetite Regulation, Fat Metabolism, Regulation of Blood Sugar, Anti-inflammatory Effects.

Guduchi:

Also known as *Tinospora cordifolia* Linn, while research specifically on *guduchi's* effects on obesity is limited, its mechanisms of action may indirectly support weight management:

- Further we can observe that, mean difference for Group A (Trial) is greater than Group B(Control).
- Hence, we can conclude that, effect observed in Group A (Trial) is better than Group B (Control).

Metabolism Regulation, Liver Support, Anti-inflammatory Effects, Immune System Modulation, Stress Reduction, Regulation of Blood Sugar.

Bhadramusta:

Its properties suggest potential mechanisms of action that could support weight management: Digestive Aid, Diuretic Effects, Metabolism Regulation, Blood Sugar Regulation, Anti-inflammatory Properties.

Dosha: At the doshic level, *Pippali Guduchi Bhadramusta churna* effectively balances *Vata* and *Kapha doshas* due to its dominance in the *Katu Rasa* (pungent taste). Its actions are further

supported by its *Laghu* (lightness) and **Snigdha** (unctuousness), which pacify *Vata*.

Dushya:

Concerning the *Dushya* (tissues), *Meda* (fatty tissue) and its associated *Kleda* (moisture) are primarily involved in obesity (*Sthoulya*). The *Katu Rasa* aids in reducing fat and moisture accumulation. The stability (*Sthairya*) provided by *Madhura rasa* counters bodily laxity, while *Ushna Virya* aids in dissolving fat and moisture.

Agni (digestive fire):

At the level of digestive fire (*Agni*) and metabolic toxins (*Ama*), the *Katu Rasa* and *Ushna Virya* stimulate the digestive fire (*Dhatwagni*), addressing its sluggishness and aiding in the digestion of improperly formed tissues (*Ama*). This helps alleviate unripe metabolic products (*Aparipakwa*) and toxins (*Ama*).

Srotas:

Regarding the channels (*Srotas*), the *Katu Rasa* promotes dilation of channels, aiding in the movement of bodily fluids. It also helps in maintaining the integrity of fat and muscle channels (*Medovaha* and *Mamsavaha Srotodushti*).

Samprapti Vighatana:

Due to causal factors intake *Khavaigunya*(moral flaw) takes place, characterized by a decrease in the proper functioning of the digestive fire (*Jatharagni*), often leads to an imbalance in *Kapha dosha*, resulting in increase in *Kapha*. This imbalance can manifest as various issues , resulting in *Ama*(undigested food product) formation eventually leading to *medovaha*

srotas obstruction further causing increase in *meda*. To address this, the formulation of *Pippali* with *Guduchi Bhadramusta churna* along with *Madhu* as *anupana* proves beneficial. It contains ingredients with *Katu rasa*, *Ushna virya*, and properties that pacify both *Kapha* and *Vata doshas* while aiding digestion and reducing the accumulation of undigested food matter (*Ama*). By facilitating the *Ama* digestion and clearing obstructions in the channels responsible for fat metabolism (*Medovaha Srotasa*), it promotes *Sroto Shodhana* (Channel obstruction removal). This helps in correcting digestive fire, ultimately reducing excessive fat accumulation (*Medovridhi*) and addressing the condition of obesity (*Sthoulya*). As a result, symptoms such as *Chala Sphika*, *Chala udara*, and *Chala stana* etc. are alleviated, leading to an improvement in overall health and vitality, contributing to the restoration of the individual's well-being (*Samprapti Vighatan*).

CONCLUSION

Pippali with *Guduchi Bhadramusta churna* and *anupan Madhu* is a safe and cost-effective option for managing obesity/*Sthoulya*. Based on observations and statistical analysis, *Pippali* with *Guduchi Bhadramusta churna* with *anupan madhu* has significantly better effects than *Guduchi Bhadramusta churna* with *anupan madhu* in treating various symptoms of *Sthoulya* (obesity).

The investigation was conducted with restricted time, facilities, and patients. A bigger sample of patients may help to understand the

trial drug's mode of action. In the future, new studies may be undertaken to take the current issue further in a suitable perspective and future prospects of reducing modern drug requirements.

Acknowledgement:

The Authors acknowledge Tilak Ayurved Mahavidyalaya and Tarachand Hospital, Pune for granting permission for this research. Authors also extend whole hearted thanks to all the adults who participated in this research project.

REFERENCES:

1. Dennis L. Kasper, Anthony S. Fauci, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson, Joseph Loscalzo(editor). Harrison's Principles of Internal Medicine ,Volume 2 ,Chapter 16 ,Section B,19th Edition, New York: The McGraw-Hill Companies,2015: 2392
2. Dennis L. Kasper, Anthony S. Fauci, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson, Joseph Loscalzo(editor). Harrison's Principles of Internal Medicine, Volume 2, Chapter 16,Section B,19th Edition, New York: The McGraw-Hill Companies, 2015:2392.
3. Yadavaji Trikamaji (editor). Charaka Samhita, Sutra sthana, chapter 21, verse no.4-9, reprint edition,Varanasi; Choukhambha Sanskrit Sansthan;2014:540
4. Bhattacharya, Taranath Tarkavachaspat (editor). Vachaspatyam: comprehensive sanskrit dictionary, Vol.3 , 4th edition, Varanaasi; Chowkhamba Sanskrit Series Office ,1990:1128
5. Yadavaji Trikamaji (editor). Charaka Samhita, Sutra sthana, chapter 21, verse no.4, reprint edition,Varanasi; Choukhambha Sanskrit Sansthan;2014:540
6. Shastri A. (editor). Sushruta Samhita (Part1), Sutra Sthana, Chapter 15,verse no.41, edition-reprint Chaukhamba Sanskrit Sansthana, 2013: 84
7. Yadavaji Trikamaji (editor). Charaka Samhita, Sutra sthana, chapter 21, verse no.4, reprint edition,Varanasi; Choukhambha Sanskrit Sansthan;2014:540
8. P.C. Sharma, M. B Yelne, T.J. Dennis, Database on Medicinal Plants used in Ayurveda, Volume 3, Central Council for Research in Ayurveda & Siddha, New Delhi 2002:404

CITE THIS ARTICLE AS

Ankita J. Kalel, Sadananad V. Deshpande. Randomized Controlled Clinical Trial of Add on Effect of Pippali On Guduchi Bhadramusta Churna in Management of Sthoulya (Obesity). *J of Ayurveda and Hol Med (JAHM)*. 2024;12(5):4-15

Conflict of interest: None

Source of support: None