WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 4, 658-680. Research Article ISSN 2277–7105

STUDY TO EVALUATE THE EFFICACY OF *SHUNTHI-HARITAKI CHOORNA* AND *KAPALBHATI* IN *STHAULYA* (OBESITY): A RANDOMIZED CONTROLLED PARALLEL-GROUP CLINICAL STUDY

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Article Received on 15 Jan. 2026,
Article Revised on 05 Feb. 2026,
Article Published on 16 Feb. 2026,

https://doi.org/10.5281/zenodo.18659924

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How to cite this Article: *1Kapil Mevafarosh, 2Trupti Jain, 3Archana Dangi, 4Vijendra Singh Mandloi, 5Nitin Marwaha, 6Sanjay Patel (2026). Study To Evaluate The Efficacy Of Shunthi-Haritaki Choorna And Kapalbhati In Sthaulya (Obesity): A Randomized Controlled Parallel-Group Clinical Study. World Journal of Pharmaceutical Research, 15(4), 658–680.

ABSTRACT

Introduction: Obesity, an increasingly prevalent global health issue, necessitates sustainable and comprehensive treatment strategies. This study examines the combined effects of *Shunthi Haritaki Choorna*, a traditional Ayurvedic formulation and *Kapalbhati*, a yogic breathing technique, in the management of obesity. **Materials and method:** This is a randomized controlled parallel group clinical trial. The present study was conducted on. 40 randomly chosen obese patients were divided into two group. The trial lasted for 45 days in total. *Shunthi-Haritaki Choorna* and 3 rounds of *Kapalbhati* were administered to Group-A in the morning. Group B served as a placebo control group and was given capsules of roasted semolina in B.D. after meals. **Results:** Group A(Control) showed significant improvement in both subjective and objective parameters of obesity. In contrast, Group B (placebo) showed minimal or no improvement. **Conclusion:** *Shunthi-Haritaki Choorna* and *Kapalbhati* treatment showed improvement in subjective and objective parameters, this was effective in obesity.

KEYWORDS: *Shunthi- Haritaki Choorna, kapalbhati, Sthaulaya*, Obesity, BMI.

INTRODUCTION

Obesity has emerged as the most prevalent sedentary lifestyle disorder in modern society. This rise can be attributed to several factors, including the increased availability of low-cost, high-calorie foods, as well as packaged ingredients that are often high in fat, sugar or salt.[1]

Additionally, a more sedentary lifestyle, urbanization and convenient transportation options contribute to this issue. Currently, obesity is spreading across the globe like an epidemic.

Obesity is associated with a variety of disorders, including Cardiovascular disease, Type 2 Diabetes Mellitus, Obstructive Sleep Apnoea, certain types of Cancer, and Osteoarthritis.[2] All of these conditions negatively impact quality of life, work productivity and medical expenses. According to the WHO estimate, there are over 250 million obese adults and around 1.1 billion overweight persons globally. The World Health Organization reports that global obesity rates have nearly quadrupled since 1975. As of 2016, more than 13% of the global population was classified as obese and 39% of individuals aged 18 and older were considered overweight.[3]

The World Health Organization classifies overweight and obesity using the BMI (Body mass index) metric. Overweight individuals have a BMI of 25-30kg/m^2, whereas obese individuals have a BMI of 30-34.9kg/m^2.[4]

Obesity is referred to as *Atisthaulya* in Ayurveda and described under *Atinindita purusha*. *Atisthaulya* occurs when there is an excessive buildup of *Meda* (fat/adipose tissue) and *Mansa* (flesh/muscle tissue), resulting in flabbiness of the hips, belly, and breasts.[5]

The pathologic process of *Sthaulya* involves the three *doshas*, namely *Kledaka Kapha*, *Pachaka Pitta*, *Samana* and *Vyana Vayu*. The primary goal of treating *Sthaulya* (obesity) is to alleviate *tridosha*, particularly *Kapha* and *Vata* in annexations with decadence of *Medodhatu* by enhancing *Medodhatvagni*.[6]

So, to treat obesity, one should choose medications that enhance feeling of satiety, correct the activities of *Jathragni* and *Dhatvaagni* (metabolism), and have properties that reduce *Meda* and *Kapha*. *Shunthi - Haritaki* and *Kapalbhati* have *Kaphvishoshini* qualities. Thus, the present study has been conducted with the following aim and objectives.

AIM

To assess the effect of *Shunthi- Haritaki Choorna* and *Kapalbhati* in *Sthaulya* (Obesity).

OBJECTIVES

To assess the anthropometric measurements (weight, BMI, waist circumference and hip circumference) before and after 45 days of treatment with *Shunthi Haritaki Choorna* and *Kapalbhati* practice.

MATERIAL AND METHOD

Study Design

This study was a randomized controlled parallel-group clinical study with a 1:1 allocation conducted as per the CONSORT statement for adherence to clinical trials. This study was started after the approval of the Institutional Ethical Committee of Pt. Khushilal Sharma Government Autonomous Ayurvedic College and Institute, Bhopal (No.- Klsgaci/IEC/2022/SV-06), dated 29-10-2022. The study period included 30 November 2022 to 23 May 2023.

Trial participants

The study comprised 40 individuals of either sex and was designed as a randomized controlled clinical trial. Patients who were selected an informed consent form and attended the OPD of the Swasthavritta, Panchakarma, and Kayachikitsa department at Pt. Khushilal Sharma Govt. (Auto.) Ayurveda College and Institute in Bhopal and fulfilled the study's inclusion criteria.

Inclusion criteria

- Patients aged 20 to 50 years, of either sex.
- Patients with a BMI between 25 and 34.9 kg/m².
- Patients who are willing to complete an informed consent form.

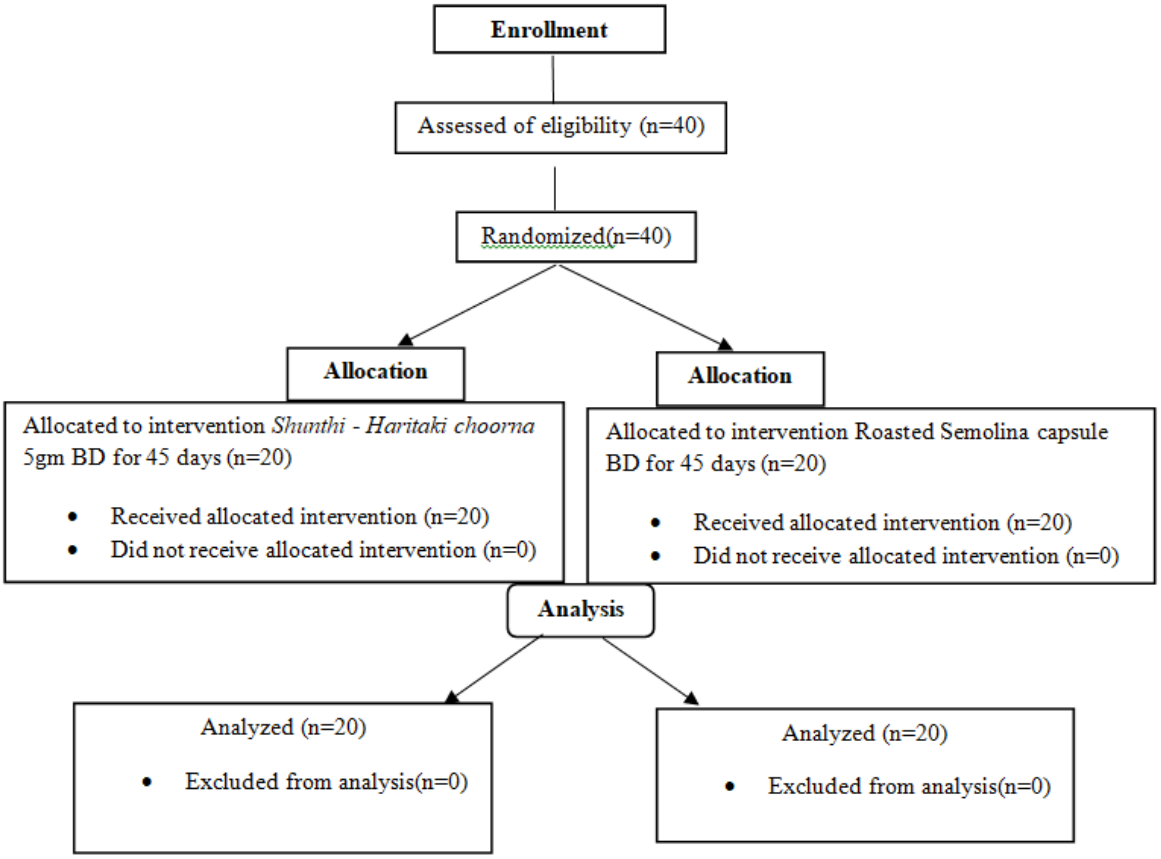
Exclusion criteria

- Patients with major systemic illnesses, such as Diabetes Mellitus, Hypertension, Cardiovascular disorders and Renal/Hepatic impairment.
- Pregnant and lactating women.
- Patients with Hyperthyroidism, Hypothyroidism and Hormonal imbalances such as PCOD and other Gynaecological disorders.
- Patients on long-term steroid and hormonal treatment**.**

Study settings

Participants were recruited in the study through OPD of Pt. Khushilal Sharma Govt. (Auto.) Ayurveda College and Institute Bhopal.

The flow chart of clinical trial.



Criteria for diagnosis

Diagnosis is based on BMI according to WHO.[7]

CLASSIFICATION	BMI
Underweight	<18.5 kg/m^2
Normal weight	18.5 – 24.9 kg/m^2
Overweight	25 – 29.9 kg/m^2
Obesity (class I)	30 – 34.9 kg/m^2
Obesity (class II)	35 – 39.9 kg/m^2
Morbid Obesity (class III)	>40 kg/m^2

Grouping

Group A: Study group (*Shunthi - Haritaki choorna* and *Kapalbhati*)

Group B: Control Group (Semolina Capsule)

Intervention

Group	Sample size	Intervention	Dose and frequency	Anupana	Duration
Group A	20	*Shunthi-Haritaki Choorna* and *Kapalbhati*	5gm twice a day after meals. 3rounds in the morning (20 Stroke-cycle)	With lukewarm water	45 days
Group B	20	Roasted Semolina capsule	500 mg twice a day after meals.	with lukewarm water	45 days

Preparation of drug

Participants in the intervention group received 5 grams of *choorna* prepared in a 2:1 ratio of *Haritaki* (Terminalia Cebula) and *Shunthi* (Zingiber officinale). Raw dry *Haritaki (Harad bakkal)* and *Shunthi* were procured from Vindhya Herbal Pharmacy, Bhopal, and their *choorna* was prepared by a pulveriser at the pharmacy department of Rasshastra of Pt. Khushilal Sharma Govt. (Autonomous) Ayurveda College, Bhopal. Medicine was dispensed monthly by research scholar. Adherence was monitored through a patient diary and verbal compliance check.

Fig. *1: Haritaki Bakkal.*

Fig. 2: *Haritaki choorna.*

Fig. 3: *Shunthi.*

Fig. 4: *Shunthi Choorna.*

Fig. 5: *Shunthi – Haritaki Choorna.*

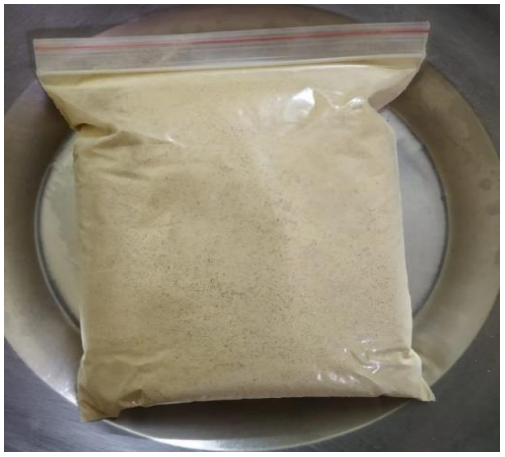


Fig. 6: Placebo capsule.

Duration of study: 45 days.

Measuring trial, outcomes- The effectiveness of the treatment was evaluated based on the changes in signs and symptoms recorded before and after the treatment. The assessment utilized both objective parameters (such as weight, BMI, waist-hip ratio, body fat percentage and skin fold thickness) and subjective parameters (*Daurbalya, Swedaabadha, Kshudaadhikya, Pipsaaadhikya, Chala Stana, Chala Udara, Chala Sphika, Nidradhikya, Anga Gaurava, Kshudra Shwas, Utsahahani*).

Objective parameters

- Weight
- BMI
- Skin fold thicknesses
- Body fat percentage
- Body circumference measurements
- Waist: Hip ratio

Subjective parameters

Score was given according to the severity of the symptoms as 0-3 grade.

1. *Daurbalya* (General debility)[8,9,10,11,12,13]

Grade	***Daurbalya***
0	Can do routine work / exercise
1	Can do moderate exercise with hesitancy
2	Can do mild exercise only, with difficulty
3	Can’t do mild exercise too

2. *Swedaabadha* (Excessive sweating)

Grade	***Swedaabadha (Atiswedapravritti)***
0	Sweating after heavy work and fast movement or in hot Weather
1	Profuse sweating after moderate work and movement
2	Sweating after little work and movement (stepping ladder etc.)
3	Profuse sweating after little work and movement or at rest

4. *Kshudaadhikya* (Polyphagia)

Grade	Main meals	Breakfast	Snacks	Quantity
0	2	1	1	Usual
1	2	1	2-3	Increased
2	2	1	3-4	Increased
3	3	1	2-3	Increased

5. *Pipsaadhikya* (Polydipsia)

Grade	***Pipsaadhikya* (Polydipsia)**
0	Normal
1	Increased but can be controlled
2	Increased with increased frequency of drinking water
3	Very much increased

6. *Chala Stana* (Pendulous movement of breast)

Grade	***Chala Stana***
0	Absence of *Chalatva.*
1	Visible movement after moderate movement.
2	Movement after mild movement.
3	Movement even after changing posture

7. *Chala Udara* (Pendulous movement of abdomen)

Grade	***Chala Udar***
0	Absence of *Chalatva*.
1	Visible movement after moderate movement.
2	Movement after mild movement.
3	Movement even after changing posture

8. *Chala Sphika* (Pendulous movement of Buttock)

Grade	***Chala Sphika***
0	Absence of *Chalatva*.
1	Visible movement after moderate movement.
2	Movement after mild movement.
3	Movement even after changing posture

9. *Nidradhikya* (Excessive sleep)

Grade	*Nidradhikya*
0	Night sleep 6-7 hours.
1	Night sleep 8-9 hours.
2	Night sleep 9-10 hours.
3	Night sleep up to 10 hours.

10. *Anga Gaurava* (Heaviness in body)

Grade	*Anga Gaurava*
0	No heaviness in body.
1	Feels heaviness in body but it does not hamper routine work.
2	Feels heaviness in body which hampers movement of the body.
3	Feels heaviness with flabbiness in all over body which causes distress to the person.

11. *Kshudra Shwas* (Dyspnoea)

Grade	*Kshudra Shwas* (Dyspnoea)
0	Dyspnoea after heavy works but relieved soon & upto tolerance.
1	Dyspnoea after moderate works but relieved late & upto tolerance.
2	Dyspnoea after little works but relieved soon & upto tolerance
3	Dyspnoea after little works but relieved soon & beyond tolerance.

12. *Utsahahani* (Laziness)

Grade	*Utsahahani* (Laziness)
0	Doing work satisfactory within time.
1	Doing work satisfactory with initiation late in time
2	Not starting any work in his own responsibility, doing little work very slow.
3	Does not have any initiation & not wants to work even after pressure.

Sample size

Total 40 patients (20 patients in each group).

Randomisation

A computer-generated randomization was utilized to assign participants to either group.

Withdrawal criteria

- If any negative effects occur in patients.
- If symptoms worsen and do not respond to treatment.
- Patients decline to receive treatment.

Statistical analysis

The data was collected and presented in tabular form and the results were statistically analysed using relevant statistical techniques such as the Wilcoxon matched-pairs signed-

ranks test, Mann-Whitney U-statistic, and Paired and Unpaired t-test. Statistical analysis was performed using Graph Pad in Stat-3 program. A P- value of 0.05 or below was considered statistically significant.

Safety parameters

The study found significant changes in weight, body mass index (BMI), waist-hip ratio, skinfold thicknesses, and body fat % after 45 days of treatment, with no serious adverse events observed.

OBSERVATION AND RESULTS

Age- In the current study, 67% of patients are between the ages of 20 and 30, followed by 28% between the ages of 31 and 40, and 5% between the ages of 41 and 50. (Table no.1)

Gender-The majority of patients (65%) were female and 35% male. (Table no.2)

Marital status- Out of 40 patients, 42.5% were married and 57.5% were unmarried. (Table no.3)

Habitat- The majority of patients (90%) were urban, with only 10% coming from rural areas. (Table no.4)

Occupation- Maximum 37.5% of patients were students, 30% were desk workers, 20% were undertaking fieldwork with intellectuals, 10% were homemakers, and 2.5% were in the business profession. (Table no.5)

Socioeconomic status- 62.5% of patients belonged to the middle class, 27.5% belonged to the upper middle class and 10% to the lower middle class. (Table no.6)

Family History- Of the 40 obese patients, 72.5% had no family history of obesity, while 27.5% had a family history of obesity. (Table no.7)

Continuous sitting hour- Maximum 52.5% of patients were in the category of 3 to 4 hours of continuous sitting. 25% had spent more than 4 hours sitting continuously. 15% of patients sat for 2 to 3 hours continuously, whereas 7.5% sat for 1to hours continuously. (Table no.8)

Agni- Among 40 patients, 47.5% had *Teekshna agni*, 30% had *Visham agni*, 12.5% had *Manda agni* and 10% had *Sama agni.* (Table no.9)

Bowel- The majority of patients (57.5%) had a regular bowel habit, 25% experienced constipation, and 17.5% had an irregular bowel pattern. (Table no.10)

Number of diets- 75% of patients took 5 to 6 diets per day, while 25% took 3 to 4 diets per day. (Table no.11)

Aahara- Of the 40 patients in the current study, 67.5% were vegetarians and 32.5% were on a mixed diet. (Table no.12)

Frequency of fast-food consumption- 52.5% of patients consumed fast food once or twice a week, 30% consumed it three to four times a week, 10% consumed it five to six times a week and 7.5% did not consume it. (Table no.13)

Sleeping hours- The majority of patients (72.5%) slept for 8 to 9 hours, followed by 15% for 10 to 11 hours and 12.5% for 6 to 7 hours. (Table no.14)

Diwaswapna- 47.5% of the patients were doing *diwaswapna* whereas 52.5%were not doing *diwaswapna.* (Table no.15)

Exercise- Out of 40 patients, 75% did not exercise, and 25% moved irregularly. (Table no.16)

Addiction- 72.5% of patients were addicted to tea/coffee, 17.5% were not addicted to anything, 5% were hooked to smoking, 2.5% were addicted to tobacco, and 2.5% were addicted to both alcohol and tobacco. (Table no.17)

Prakriti- 50% of patients had *VK Prakriti,* 22.5% had *VP Prakriti,* 22.5% had *PK Prakriti,* and 5% had *VPK Prakriti.* (Table no.18)

Srotodushti- 77.5% of patients had *Medovaha Srotodushti,* 20% had *Rasavaha Srotodushti* and 2.5% had *Purisavaha Srotodushti.* (Table no.19)

Clinical symptoms- The maximum number of patients (92.5%) had *Chala Udara,* 90% had *Angagourava,* 80% had *Kshudaadhikya* and *Swedadhikya,* 75% had *Chalasthana,* 65% had *Kshudraswasa,* 62.5% had *Pipasaadhikya,* 47.5% had *Daurbalya,* 37.5% had *Chalasphika,* and 17.5% had *Utsahahani*. (Table no.20)

Weight- 35% of patients weighed 71 to 80 kg, 30% weighed 61 to 70 kg, 22.5% weighed 81 to 90 kg, 5% weighed 91 to 100 kg, 5% weighed 50 to 60 kg, and 2.5% weighed 101 to 110 kg. (Table no.21)

BMI- The maximum BMI for 57.5% of patients was between 25 and 29.9 kg/m^2 (overweight), and 42.5% of patients had a BMI between 30 and 34.9 kg/m^2 (obesity class I). (Table no.22)

Body fat%- 37.5% of patients had a body fat% ranging from 30 to 39.9%, 35% had a body fat% ranging from 40 to 49.9%, 22.5% had a body fat% ranging from 20 to 29.9%, and 5% had a body fat% of 50 to 60%. (Table no.23)

Effect analysis

Effect of treatment on clinical profile

Effect of treatment on Subjective parameter (Clinical Symptoms)

Group A (*Shunthi-Haritaki Choorna* with *Kapalbhati*) showed significant improvement in all clinical complaints, with mean differences ranging from $p<0.05$ to $p<0.0001$. This confirms the treatment's efficacy. Changes in Group B (placebo) were largely statistically insignificant ($p > 0.05$), with the exception of *Anga Gaurava*, which improved somewhat ($p = 0.0156$).

Significant differences ($p<0.05$ to $p<0.0001$) between groups were seen in *Swedadhikya, Kshudaadhikya, Pipasaadhikya, Chala Udara, Nidraadhika, Anga Gaurava* and *Kshudrashwasa,* suggesting Group A's greater efficiency. Though *Daurbalya, Chala Stana, Chala Sphika,* and *Utsahahani* did not differ statistically between groups, Group A had a larger mean improvement, implying greater therapeutic efficacy. (Table no.24)

Effect of treatment on Weight and BMI

In Group A, both weight (↓4.38 kg) and BMI (↓1.76) showed extremely significant reductions ($p<0.0001$) post-treatment, indicating strong treatment efficacy. In Group B, changes in weight (+0.30 kg) and BMI (+0.115) were statistically insignificant ($p>0.05$). Intergroup comparison confirmed extremely significant differences ($p < 0.0001$) in Favor of Group A. (Table no.25).

Skin fold thickness

In Group A, abdominal and thigh skin fold thickness significantly reduced by 4.20 mm and 2.90 mm, respectively ($p<0.0001$), indicating strong treatment efficacy. In Group B, minor

changes (+0.35 mm in abdomen, +0.05 mm in thigh) were either statistically insignificant or marginally significant, showing no real therapeutic effect. Intergroup comparison confirmed extremely significant differences ($p < 0.0001$) for both parameters, favouring Group A. (Table no.26).

Effect of treatment on Body circumference

In Group A, significant reductions were observed in chest, abdomen, hip, and waist circumference (MD: 1.875 cm, 3.545 cm, 2.780 cm, 2.975 cm; $p<0.0001$), confirming the effectiveness of the treatment. In Group B, changes were minimal and statistically insignificant in all parameters except a slight waist reduction ($p=0.0407$, not clinically meaningful). Intergroup comparison showed statistically extremely significant differences ($p \leq 0.0006$) across all parameters, favouring Group A. (Table no.27).

Effect of treatment on Waist- Hip Ratio

In both Group A and Group B, changes in waist-hip ratio were statistically insignificant ($p=0.0958$ and $p=0.5272$, respectively). Group A showed a slight decrease (MD = 0.00685), while Group B showed a minimal increase (MD = 0.0005). Intergroup comparison also showed no significant difference ($p=0.0730$). (Table no.28).

Table No. 1: Age wise distribution of patients.

Gender	No. of patients	Percentage (%)
Male	14	35
Female	26	65
Total	40	100

Table No. 2: Gender wise distribution of patients.

Gender	No. of patients	Percentage (%)
Male	14	35
Female	26	65
Total	40	100

Table No. 3: Marital status wise distribution of patients.

Marital status	No. of patients	Percentage (%)
Married	17	42.5
Unmarried	23	57.5
Total	40	100

Table No. 4: Habitat wise distribution of patients.

Habitat	No. of Patients	Percentage (%)
Rural	4	10
Urban	36	90
Total	40	100

Table No.5 Occupation wise distribution of patients

Occupation	No. of Patients	Percentage (%)
Desk work	12	30
Field work with physical labor	00	00
Field work with intellectual	08	20
Business	01	2.5

Home maker	04	10
Student	15	37.5
Total	**40**	**100**

Table No. 6: Socio economic status wise distribution of patients.

SES	No. of patients	Percentage (%)
Poor	00	0
Lower middle	04	10
Middle	25	62.5
Total	40	100

Table No. 7: Family History wise distribution of patients.

Family history	No. of patients	Percentage (%)
Present	11	27.5
Absent	29	72.5
Total	40	100

Table no. 8 Continuous sitting hours wise distribution of patients.

Continuous sitting hours	No. of patients	Percentage (%)
1 to 2	03	7.5
2 to 3	06	15
3 to 4	21	52.5
> 4	10	25
Total	40	100

Table No. 9: *Agni* wise distribution of patients.

Agni	No. of Patients	Percentage (%)
Sama	04	10
Visham	12	30
Manda	05	12.5
Teekshna	19	47.5
Total	40	100

Table No. 10: Bowel wise distribution of patients.

Bowel	No. of patients	Percentage (%)
Regular	23	57.5
Irregular	07	17.5
Constipation	10	25
Loose	00	0
Total	40	100

Table No. 11: No of diet wise distribution of patients.

No. of diet	No. of patients	Percentage (%)
1 to 2	00	0
3 to 4	10	25
5 to 6	30	75
Total	40	100

Table No. 12: *Aahara* wise distribution of patients.

Aahara	No. of patients	Percentage (%)
Vegetarian diet	27	67.5
Mix diet	13	32.5
Total	40	100

Table No. 13: Frequency of fast- food consumption wise distribution of patients.

Frequency of fast- food consumption (Times/week)	No. of patients	Percentage (%)
0	03	7.5
1 – 2	21	52.5
3 – 4	12	30
5 – 6	04	10
Total	40	100

Table No. 14: Sleeping hours wise distribution of patients

Sleeping hour	No. of patients	Percentage (%)
6 – 7 hrs.	05	12.5
8 – 9 hrs.	29	72.5
10 – 11 hrs.	06	15
Total	40	100

Table No. 15: *Diwaswapna* wise distribution of patients.

Diwaswapna	No. of patients	Percentage (%)
Yes	**19**	**47.5**
No	**21**	**52.5**
Total	**40**	**100**

Table No. 16: Exercise wise distribution of patients.

Exercise	No. of patients	Percentage (%)
Yes	10	25
No	30	75
Total	40	100

Table No. 17: Addiction wise distribution of patients.

Addiction	No. of patients	Percentage (%)
Tea /Coffee	29	72.5
Tobacco	01	2.5
Smoking	02	5
Tea + Tabaco + Smoking	00	0
Tobacco + Alcohol	00	0
Alcohol+ Smoking	01	2.5
Tobacco + Alcohol+ Smoking	00	0
None	07	17.5
Total	40	100

Table No. 18: *Prakriti* wise distribution of patients.

Prakriti	No. of Patients	Percentage (%)
VP	9	22.5
VK	20	50
PK	9	22.5
VPK	2	5
Total	40	100

Table No. 19: *Srotodushti* wise distribution of patients.

Srotas	No. of patients	Percentage (%)
Rasavaha	08	20
Medavaha	31	77.5
Purisavaha	01	2.5
Total	40	100

Table No. 20: Clinical symptoms wise distribution of patients.

Chief Complaints	No. of Patients	Percentage (%)
Daurbalya	19	47.5

Swedadhikya	32	80
Kshudhadhikya	32	80
Pipasaadhikya	25	62.5
Chalstana	30	75
Chaludara	37	92.5
Chalsphika	15	37.5
Angagourav	36	90
Kshudraswasa	26	65
Utsahahani	07	17.5

Table No. 20: Weight wise distribution of patients.

BMI (kg/m^2)	No. of patients	Percentage (%)
50 – 60	02	5
61 – 70	12	30
71 – 80	14	35
81 – 90	09	22.5
91 – 100	02	5
101 – 110	01	2.5
Total	40	100

Table No. 21: BMI wise distribution of patients.

BMI (kg/m^2)	No. of patients	Percentage (%)
25 – 29.9	23	57.5
30 – 34.9	17	42.5
Total	40	100

Table No. 22: Body fat% wise distribution of patients.

Body Fat %	No. of Patients	Percentage (%)
20 – 29.9	09	22.5
30 – 39.9	15	37.5
40 – 49.9	14	35
50 – 60	02	5
Total	40	100

EFFECT OF TREATMENT ON CLINICAL PROFILE

Table No. 24: Effect of treatment on Subjective parameter (Clinical Symptoms).

Sign □□& Symptoms	Group	Mean		M.D.	% Relief	S. D	S. E	Wilcoxon matched pair - signed & P value
		BT	AT					
Daurbalya **(weakness)**	(N=20)	0.6500	0.2000	0.4500	69.23	0.5104	0.1141	W=45, N9 p=0.0039 VS**
	B (N=20)	0.6000	0.5000	0.1000	16.66	0.3078	0.06882	W=3, N=2 p=0.5000 NS
	Mann- Whitney U- statistic = 130, p = 0.0522, NS							
Swedadhikya **(Excessive sweetening)**	**A** (N=20)	1.300	0.5000	0.8000	61.53	0.4104	0.09177	W= 136, N=16, p<0.0001 ES****

	B (N=20)	1.150	1.100	0.05000	4.347	0.3940	0.08811	W= 2, N=3 p=0.7500 NS
	Mann- Whitney U statistic = 58, p= 0.0001, ES***							
Kshudaadhika (**Excessive Appetites**)	**A** (N=20)	1.650	0.6000	1.050	63.63	0.5104	0.1141	W= 171, N=18, p<0.0001 ES****
	B (N=20)	1.450	1.250	0.2000	13.79	0.4104	0.09177	W= 10, N=4 p=0.1250 NS
	Mann- Whitney U- statistic = 54, p<0.0001, ES****							
Pipasaadhikya **(Excessive Thirst)**	**A** (N=20)	0.6500	0.1500	0.5000	76.92	0.5130	0.1147	W= 55, N=10, p=0.0020 VS**
	B (N=20)	0.6500	0.5500	0.1000	15.38	0.3078	0.06882	W= 3, N=2 p= 0.5000 NS
	Mann Whitney U- statistic= 120, p= 0.0268 S*							
Chalastana **(Pendulous Breast)**	**A** (N=20)	0.8000	0.4000	0.4000	50	0.5026	0.1124	W=36, N=8 p=0.0078 VS**
	B (N=20)	1.200	1.100	0.1000	8.333	0.3078	0.06882	W=3, N=2 p=0.5000 NS
	Maan Whitney U statistic = 140, p= 0.0954, NS							
Chala Udar **(Pendulous Abdomen)**	**A** (N=20)	1.100	0.3500	0.7500	68.181	0.4443	0.09934	W= 120, N=15, p<0.0001 ES****
	B (N=20)	1.100	0.9000	0.2000	18.181	0.4104	0.09177	W= 10, N=4 p=0.1250 NS
	Maan- Whitney U statistics = 90, p= 0.0027, VS**							
Chala Sphika **(Pendulous Buttock)**	**A** (N=20)	0.3500	0.05000	0.3000	85.71	0.4702	0.1051	W= 21, N=6 p=0.0313 S*
	B (N=20)	0.5500	0.4500	0.1000	18.18	0.3078	0.06882	W= 3, N=2 p=0.5000 NS
	Mann- Whitney U statistics = 160, p= 0.2655, NS							
Nidraadhika **(Excessive Sleep)**	**A** (N=20)	1.000	0.1500	0.8500	85	0.4894	0.1094	W= 136, N=16, p<0.0001 ES****
	B (N=20)	0.9000	0.7500	0.1500	16.66	0.3663	0.08192	W= 6, N=3 p= 0.2500 NS
	Mann- Whitney U statistics = 68.500, p= 0.0003, ES***							
Anga Gaurava **(Heaviness in**	**A** (N=20)	0.9500	0.2000	0.7500	78.94	0.4443	0.09934	W= 120, N= 15, p<0.0001

Body)								E****
	B (N=20)	1.050	0.7000	0.3500	33.333	0.4894	0.1094	W= 28, N=7, p=0.0156 S*
	Mann- Whitney U statistics = 120, p = 0.0290, S*							
***Kshudrashwaa* (Dyspnoea)**	**A** (N=20)	0.7000	0.1000	0.6000	85.71	0.5026	0.1124	W= 78, N=12, p=0.0005 ES***
	B (N=20)	0.6500	0.5500	0.1000	15.38	0.3078	0.06882	W= 3, N= 2 p= 0.5000 NS
	Mann- Whitney U statistics = 100, p = 0.0059 VS**							
***Utsahahani* (Laziness)**	**A** (N= 20)	0.4500	0.1500	0.3000	66.66	0.4702	0.1051	W= 21, N=6 p=0.0313 S*
	B (N=20)	0.3000	0.1500	0.1500	50	0.3663	0.08192	W= 6, N= 3 p= 0.2500 NS
	Mann- Whitney U statistics = 170, p= 0.4075, NS							

Table No. 25: Effect of treatment on Weight and BMI.

Parameter	Group	Mean		MD	SD	SE	Paired t Test	P value
		BT	AT					
Weight	**A** (N=20)	74.64	70.26	4.380	0.9203	0.2058	21.284	p<0.0001 ES****
	B (N=20)	77.36	77.66	0.3000	1.119	0.2503	1.199	P=0.2454 NS
		Unpaired t test p<0.0001, t= 14.444, ES****						
BMI	**A** (N=20)	29.510	27.750	1.760	0.3545	0.07927	22.202	p<0.0001 E****
	B (N=20)	29.975	30.090	0.115	0.4499	0.1006	1.143	P=0.2672 NS
		Unpaired t test p<0.0001, t= 14.640, ES****						

Table No. 26: Skin fold thickness.

Skin fold thickness	Group	Mean		MD	SD	SE	Paired t test	P value
		BT	AT					
Abdomen	**A** (N=20)	33.550	29.350	4.200	1.704	0.3811	11.020	p<0.0001ES****
	B (N=20)	33.400	33.750	0.3500	0.5871	0.1313	2.666	P=0.0153 S*
	Unpaired t test= 11.287, p<0.0001 ES****							
Thigh	**A** (N=20)	32.000	29.100	2.900	1.744	0.3900	7.436	p<0.0001 ES****
	B (N=20)	34.250	34.300	0.0500	0.2236	0.0500	1.000	P=0.3299 NS
	Unpaired t test= 6.925, p<0.0001 ES****							

Table No. 27: Effect of treatment on Body circumference.

Body Circumference	Group	Mean		MD	SD	SE	Paired t test	P value
		BT	AT					
Chest	**A** (N=20)	98.150	96.275	1.875	1.180	0.2638	7.109	p<0.0001 ES****
	B (N=20)	100.35	100.69	0.3350	0.8412	0.1881	1.781	P=0.0909 NS
	Unpaired t test= 6.822, p<0.0001, ES****							
Abdomen	**A** (N=20)	95.420	91.875	3.545	1.256	0.2808	12.623	p<0.0001ES****
	B (N=20)	100.31	100.55	0.2450	0.7156	0.1600	1.531	P=0.1422 NS
	Unpaired t test 11.726, p<0.0001, ES****							
Hip	**A** (N=20)	105.81	103.03	2.780	1.163	0.2600	10.691	p<0.0001ES****
	B (N=20)	109.00	110.15	1.150	4.583	1.025	1.122	P=0.2758 NS
	Unpaired t test= 3.717, p= 0.0006 ES***							
Waist	**A** (N=20)	90.175	87.200	2.975	1.400	0.3130	9.504	p<0.0001ES****
	B (N=20)	93.660	93.825	0.1650	0.3360	0.07514	2.196	P=0.0407 S*
	Unpaired t test= 9.754, p<0.0001 ES****							

Table No. 28: Effect of treatment on Waist- Hip Ratio.

Waist-Hip ratio	Mean		MD	SD	SE	Paired t test	P value
	BT	AT					
A (N=20)	0.8591	0.8522	0.006850	0.01748	0.003909	1.752	P=0.0958 NS
B (N=20)	0.8589	0.8594	0.0005000	0.003472	0.0007763	0.6441	P=0.5272 NS
Unpaired t test= 1.844, p= 0.0730							

DISCUSSION

Obesity is a significant and challenging issue in today's world due to its long-term consequences and associated life-threatening diseases. Our classical texts outline various therapeutic approaches for *Sthaulya.* Acharya Charaka introduces the concept of *Guru Cha Aptarpana*, which closely parallels modern medical practices. *Guru dravya i*s an appetite suppressant, and *Aptarpana* has an added advantage over modern medications because it aids in *Medo kshaya*. After all, these diets are completely free of fat.

Possible justification of effect of therapy

In *Sthaulya, medodhatwagnimandya* causes *vikrut medodhatu* to build in various parts of the body, resulting in symptoms such as *Chala Sphika, Chala Udara,* and *Chala Stana*. Patients who had gained weight (*bharvraddhi*) experienced difficulty breathing (*kshudrashwasa*).

Shunthi-Haritaki, which has *Katu Ras*, *Lagu Ushna Guna*, *Deepan Pachana*, and *Kapha Medohar* qualities, alleviates these symptoms. It also contains a high concentration of saponins, phytosterols, chebulinic acid, and corilagin, which are responsible for its hypolipidemic properties. *Kapalbhati* is a type of abdominal-respiratory-autonomic exercise. It consists of a fast and powerful exhalation followed by passive inhalation. Active breathing raises the metabolic rate, which increases the energy consumption of the abdomen and other muscles in the body. A faster metabolism can assist in burning excess calories and fat more efficiently, thus aiding in weight loss.[14] Weight loss is connected with regional fat distribution, so a reduction in body fat may alleviate the symptoms listed above.

Obesity is characterized by an excess of adipose tissue (fat), leading to weight gain and increases in BMI, body circumference, body fat percentage, and skinfold thickness. This condition is prevalent, particularly in areas with abundant food resources and sedentary lifestyles. *Shunthi* and *Haritaki* are both well-known and cost-effective remedies recognized for their properties, including *Deepana*, *Pachana*, *Anulomana*, and *Lekhana*. Due to their *Ushna veerya*, these medications work effectively together to metabolize excess fat and prevent the excessive accumulation of *Kapha* and *Meda dhatu*. *Kapalbhati* causes rapid muscular contraction of abdominal muscles and accelerates metabolism. As a result, *Shunthi - Haritaki Choorna* and *Kapalbhati* provide treatment for *Kapha* and *Medo*-related symptoms such as weight gain, BMI, body circumference, body fat percentage, and skin fold thickness. Respiratory, abdominal, and gastrointestinal receptors are triggered in *Kapalbhati* as a result of quick and strong abdominal muscular contractions. As a result of increased metabolic rate, the energy consumption of abdominal and other muscles in the body increases. A faster metabolism can help you burn excess calories and fat more efficiently, thus aiding in weight loss. Weight loss is correlated with regional fat distribution; therefore, lowering body fat may alleviate *Kapha* and *Meda*-related diseases such as weight increase, BMI, body circumference, body fat percentage, and skin fold thickness.

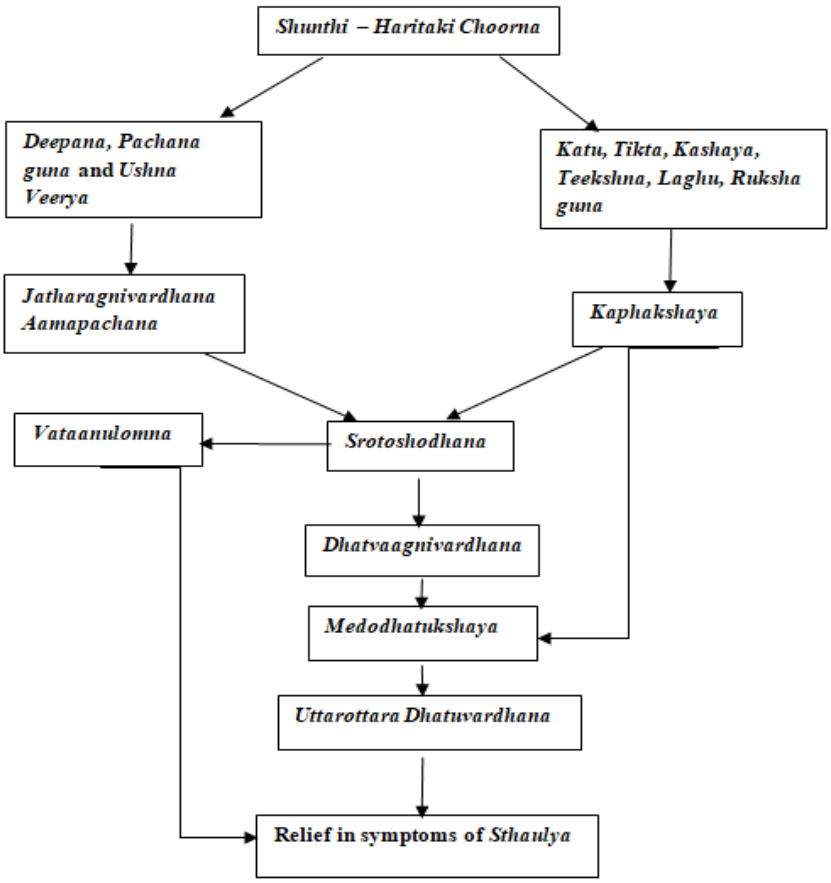


Fig. 1: *Sampraptivighatan* through *Shunthi-Haritaki choorn.*

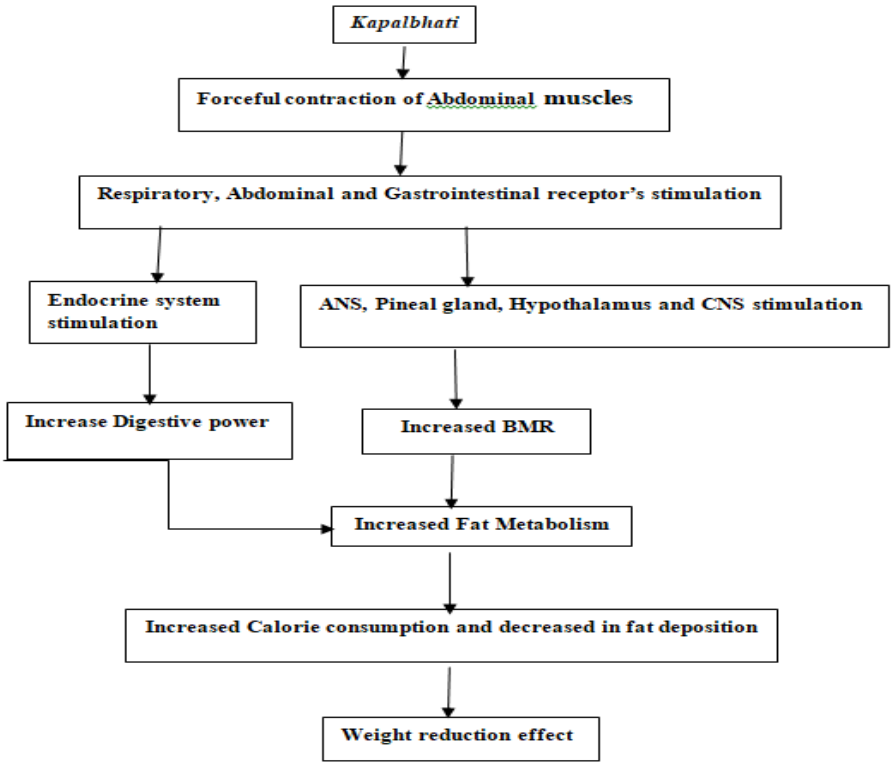


Fig. 2: *Sampraptivighatan* through *Kapalbhati.*

Limitation of the study

This work was conducted with great care; however, there may be biases in the research and in the interpretation of concepts due to the small study sample and the limited timeframe in which it was completed.

Future scope

Further research involving a larger sample size and extended duration is necessary for a more accurate evaluation and analysis of the findings. To gain a deeper understanding of the therapeutic effects of *Kapalbhati* and *Shunthi-Haritaki Choorna*, additional studies focusing on herbal formulations and Yoga practices are recommended.

Additional beneficial yoga practices could be combined with *Kapalbhati* in future studies. Furthermore, researcher should examine the impact of *'Ritu Kal'* on natural weight growth physiology. Additionally, obesity in Class II and Class III could be explored further.

CONCLUSION

The study indicates that *Sthaulya* (obesity) is a *Santarpanjanya Vyadhi* resulting from the vitiation of *Kapha* and *Meda* due to unhealthy food and lifestyle choices. *Shunthi-Haritaki Choorna* coupled with *Kapalbhati* resulted in significant improvements in both objective and subjective obesity measures. This combination is effective, safe, affordable, and simple to implement for treating obesity without adverse effects.

Data availability statement

The trial is registered with CTRI. A summary of the data available through CTRI.

Source of funding

No

Declaration of competing interest

Nil

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सारांश

परिचय: मोटापा, एक बढ़ती हुई वैश्विक स्वास्थ्य समस्या है, जिसके लिए स्थायी और व्यापक उपचार रणनीतियाँ आवश्यक हैं। यह अध्ययन पारंपरिक आयुर्वेदिक योग, **शुण्ठी-हरितकी चूर्ण** और योगिक श्वास तकनीक **कपालभाति** के संयुक्त प्रभावों की मोटापे के प्रबंधन में जांच करता है। यह शोध पारंपरिक भारतीय ज्ञान पर आधारित एक प्राकृतिक हस्तक्षेप प्रदान करने का प्रयास करता है।

सामग्री एवं विधि

यह एक **रैंडमाइज़्ड कंट्रोल्ड पैरेलल ग्रुप क्लिनिकल ट्रायल** है। अध्ययन के लिए 20 से 50 वर्ष की आयु के 40 प्रतिभागियों को पंजीकृत किया गया (प्रत्येक समूह में 20 रोगी)। 40 मोटे रोगियों को यादृच्छिक रूप से दो समूहों में विभाजित किया गया। यह परीक्षण कुल 45 दिनों तक चला। **समूह-A** को सुबह के समय शुण्ठी-हरितकी चूर्ण और कपालभाति के 3 राउंड दिए गए। **समूह-B** को प्लेसबो नियंत्रण समूह के रूप में लिया गया, जिसे भोजन के बाद बी.डी. रोस्टेड सूजी की कैप्सूल दी गई।

परिणाम: समूह-A (नियंत्रण समूह) ने मोटापे के **आधिकारिक और व्यक्तिपरक दोनों प्रकार के मापदंडों** में उल्लेखनीय सुधार दिखाया। इसके विपरीत, समूह-B (प्लेसबो) में न्यूनतम या कोई सुधार नहीं देखा गया।

निष्कर्ष: **शुण्ठी-हरितकी चूर्ण और कपालभाति** का उपचार व्यक्तिपरक एवं वस्तुनिष्ठ लक्षणों से राहत प्रदान करता है, चयापचय को बढ़ाता है और यह सुरक्षित तथा सस्ता है।

कीवर्ड्स: शुण्ठी-हरितकी चूर्ण, कपालभाति, स्थौलय, मोटापा, बी.एम.आई.