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CLINICAL EVALUATION OF RASANJANA IN STHAULYA (OBESITY)

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ABSTRACT

Background: WHO's latest projection indicates that globally obesity has nearly tripled since 1975. Obesity (*Sthaulya*) is defined as abnormal or excessive fat accumulation that may impair health. Ashtang Hridaya has mentioned *Rasanjan* as best treatment of *Sthaulya* in *Agrya Dravya*. *Rasanjan* is a herbal and animal origin (*Jangama*) product, which is prepared mainly by *Daruharidra Kvath* (Extracts of Berberis aristata) and Ajakshir (Goat's milk) or Gokshir (Cow's milk) *Rasanjan* is known to have *Katu* and *Tikta Ras, Ushna Veerya, Kaphanashak* and *Chedana Karma*. **Aim:** To evaluate the efficacy of *Rasanjan* in the management of obesity (*Sthaulya*). **Material and Methods:** A randomized control clinical trial was conducted for 60 days with Sample size of 30. *Rasanjan* along with diet and exercise was given. **Results:** Study showed statistically significant P-Value for all parameters(subjective and objective) is less than 0.001 when analysed by Wilcoxon Signed Rank Test. **Conclusion:** *Rasanjan's* properties are opposite to that of *Kapha* and *Meda*, therefore with *Samanya-Vishesh siddhant* it helps in reducing *Meda* in body and thus helps in obesity. Obesity is a lifestyle related disorder and it cannot be managed without making lifestyle changes. *Rasanjan* along with diet and exercise works well in management in *Sthaulya.*

KEYWORDS: *Rasanjan* as best treatment of *Sthaulya* in *Agrya Dravya*.

INTRODUCTION

World Health Organization's latest projection indicates that globally obesity has nearly tripled since 1975. In 2016, more than 1.9 billion adults (age 18+) were overweight, out of these over 650 million were obese. About 39% of adults aged 18 years+ were overweight in 2016, and 13% were obese. 41 million children under the age of 5 were overweight or obese in 2016.

Overweight and obesity are linked to more death worldwide than underweight.[1] WHO states two main causes of obesity which are consumption of energy dense food that are high in fats and decrease in physical activity due to urbanization, transportation and sedentary lifestyle at work. According to Ayurveda, Acharya *Sushrut* mentions that *Sthaulya* and *karshya* are due to rasa dhatu[2] and also states that *madhyam sharir* is best[3] as both *sthula* and *karshya* are always affected by some diseased condition. Ayurveda includes *Atisthula* (Obese) and *Atikrisha*(emaciated) persons in *Astha Ninditiya purushas*[4] (eight despised or undesirable physiques). *Sthaulya* has been categorized as disease cause due to *santarpan. Atisthula purusha* is said to suffer from the following defects- *Javaparodha* (Decreased Activities), *Alpa-vyavayita* (Reduced Vyavya), *Daurbalya* (Weakness), *Daurgandhya* (Excessive smell), *Swedabadha* (Excessive sweating), *Ati-trisha* (Excessive thirst), *Ati-kshudha* (Excessive Hunger). One reference from *Sushrut Samhita* for treatment of obesity stated that if the condition develops person should use *Shilajatu, Guggulu, Gomutra, Triphala, Loharaja, **Rasanjan,** Madhu, Yava, Mudga, Koradusaka, Syamaka, Uddalaka* etc which create dryness and clear the obstructed channels and also physical exercise, scarificant enemas etc can be done.[5]

Similarly Acharya *Vagbhat* has also mentioned *Rasanjan* in treatment of *Sthaulya* in Chapter 14 – "*Dvividhupakramaniya Adhyay"* in *Sutra Sthana*. (A.H. Su. 14/23)[6] *Ashtang Hridaya* has mentioned *Rasanjan* as best treatment of *Sthaulya* in *Agrya Dravya* explained in 40th Chapter of *Uttartantra – "Vajikarana Vidhi Adhyay"* (A.H. Ut. 40/49)[7] *Rasanjan* is a herbal and animal origin (*Jangama*) *Dravya* which is prepared in laboratory mainly by *Daruharidra kvath* (Extracts of Berberis aristata) and *Gokshir* (Cow's milk).[8] *Rasanjan* is known to have *Katu* And *Tikta Ras, Ushna Veerya, Kaphanashak And Chedana Karma*.[9]

AIM

To evaluate the efficacy of *Rasanjan* in the management of obesity (*Sthaulya*).

MATERIAL AND METHODS

1. Rasanjan was prepared after authentication and standardization of the raw materials i.e *Daruharidra* and Goat Milk. 1 part of *daruharidra mula (*root*)* free from insects will be taken and washed properly for removal of any soil particles and then 16 parts of water will be added to it which will be subjected to heating on *mandagni* till the contents are reduced to 1/4th of the total amount, then it will be filtered through muslin cloth, this will be the decoction of *daruharidra*. This decoction of *daruharidra* will be mixed with an equal amount of *godughda* and subjected to heating on *mandagni* till the contents are reduced to 1/4th of the total amount. This preparation is known as *rasanjana*[10] to which we will add binding agent i.e., Acacia (2 % to 5%) for the *vati* formation. **Dose of drug -** 500 mg tablet, twice a day before meal with luke warm water. **Duration of Treatment:** 2 Months. Follow up will be done after every 15 days during the course of treatment.
2. Diet chart was prepared and was verified by experts in the field and dietician. Do's and Don't's in the diet and lifestyle according to Ayurveda were explained in the form of attractive poster.
3. Digital weighing Scale- The smart weighing scale of company RENPHO was used. It also shows 11 Essential Measurements - Scale shows body weight, data including Weight, BMI, Body Fat Percentage when connected to app. It has maximum capacity of 180 kg and is FDA/CE/FCC/ROHS Certified.
4. Measuring Tape- Measuring tape with locking tip and push button of company caretouch were used for measuring circumference of body parts for assessment of obesity. The study vinyl tape measured 60 inches (150 cm) in length.
5. Skin Fold callipers- These were used of company caretouch for assessment of body fat percentage for assessment of obesity. Measurement of fat with skin fold callipers can be done in three easy steps : Pinch, Click and Read.

The study got approved by Institutional Ethics Committee (dated: 25/11/2023) and trial was registered in Clinical Trial Registry of India dated: 01/11/2024) Trial registered Prospectively. Randomized control clinical trial was conducted in which 30 patients were registered from outpatient department and in patient department of Hospital. They were taken for study after getting informed consent. *Rasanjan* in the form of vati (5oo mg tablet twice a day before meal with lukewarm water) along with Diet and lifestyle advice.

Patients were enrolled after baseline assessment and assessment of inclusion and exclusion criteria. Complete history was taken including demographic details, present and past history of illness, addictions, dietary history, family history etc. Continuous reminders for intake of medicines, diet and exercise motivation and follow up reminders were given through SMS and phone calls. Drug dispensed was always given for 15 days and patient was called for follow up after 15 days. Data was collected after every 15 day follow up. Study was conducted for 60 days which consisted of total five visits i.e on Day 0, Day 15th, Day 30th, Day 45th and Day 60th

Inclusion criteria: Patients having sign and symptoms of *Sthaulya* explained in Ayurvedic Texts, patients within the age range of 20 to 50 years will be chosen, patients of any gender will be chosen, patients having BMI in range of 25-40 kg/m2 (i.e., Overweight, Obesity class-I & Class- II).

Exclusion criteria: Patients having age of less than 20 years and greater than 50 years will be excluded, patients having BMI less than 25 kg/m2 and greater than 40 kg/m2, patients with known history of genetic syndrome and having major systemic disorders such as Pulmonary disease, HTN and DM, Hepatic Diseases, Renal Diseases and other Endocrine Disorders will be excluded, patients with Psychiatric Disorders and any other Mental Disorder will be Excluded, patients with past surgical intervention for obesity will be excluded, pregnant and Lactating women will be excluded.

Criteria for Assessment: a. Subjective Parameters.

Sr No.	Subjective Criteria	Grade-0	Grade-1	Grade-2	Grade-3	Grade-4
1.	***Chalasphik Udara Stana (Pendulous movement of buttocks, belly, breast)***	Absence of *Chalatva*.	Little visible movement (in the areas) after fast movement.	Little visible movement (in the areas) even after moderate movement	Visible movement (in the areas) after mild movement.	Visible movement (in the areas) even on changing the posture.
2.	***Alasya***	No *Alasya* (doing work Satisfactori ly with proper vigor in time).	Doing work Satisfactori- ly with late initiation.	Doing work unsatisfactori ly under mental pressure and takes time.	Not starting any work on his responsibiliti es and doing little work very slowly.	Does not take any initiation n and not want to work even after pressure.
3.	***Dourbalyata***	Routine exercise can be performed.	Perform moderate activity without any difficulty.	Perform only mild exercise.	Perform gentle exercise with very difficulty.	Cannot do even gentle exercise.
4.	***Swedadikyata***	Sweating after heavy work and fast movement or in the hot season.	Mild sweating after moderate work and movement.	Mild sweating after little work and movement.	Moderate sweating after little work and movement.	Profuse sweating on little work and moveme - nt.
5.	***Daurgandhyta***	Bad smell absent.	Bad smell present occasionally, it can remove after taking bath.	Persistent bad smell limited to close areas, difficult to suppress with deodorants.	Constant bad smell felt from long distance and is not suppressed by deodorant.	Persisten t bad smell felt from long distance even intolerab -le.
6.	***Kshudraswasa***	Dyspnoea after heavy work but relieved soon and up to tolerance.	Dyspnoea after moderate work but reduce later and up to tolerance.	Dyspnoea after little work but reduced later and up to tolerance.	Dyspnoea after minor work but decrease after that and beyond tolerance.	Dyspnoe - a in resting conditio - n.
7.	***Atinidra***	No day sleep, can get up early, night sleep<6 hours.	Can avoid day sleep easily but feel drowsy, night sleep<7-8 hours.	Cannot prevent day sleep, feel tired, day sleep 1-2 hours and night sleep 8-9 hours.	Constantly tired, day sleep 3-4 hours and night sleep 9-10 hours.	Sleep while sitting, day sleep 5- 6h ours and night sleep>1 0 hours.
8.	***Atipipasa***	Normal thirst.	Up to1litre excess intake of water.	1-2litres excess Intake of water.	2-3litres excess intake of water.	More than 3litres excess intake of water.
9.	***Kshudhaatimatr am***	Become hungry after 6 hours.	Become hungry after 4-5 hours.	Become hungry after 3 hours.	Become hungry after 2-3 hours.	Become hungry after2 hours.

b. Objective Parameters

The objective assessment will be done on the basis of changes in.

Body weight (in kg), BMI (25-40 kg/m2 i.e., overweight, obesity class-I & II), Waist-hip ratio (men > 0.9 and women >0.8), Skin fold thickness (mid triceps).

These objective assessments will be carried out before and after completion of trial.

Investigations

Lipid Profile.

CBC, Thyroid profile, HbA1C, KFT, LFT - if required.

Urine: Routine, Microscopic- if required.

These investigations will be carried out before and after completion of trial.

Statistical analysis

The data obtained in clinical study were subjected to statistical tests.

Quantitative data was compiled, segregated and analysed through statistical tests. All information which are based on various parameter was gathered and statistical study was carried out in terms of mean (X), median, Standard Deviation (S.D.), Standard Error (S.E.), Paired t-Test (t-value) and finally result were incorporated in terms of probability (p) as:

P>0.050 Not significant, P<0.050-Significant, P<0.001 – Highly significant. Wilcoxon signed ranked test was applied on criteria of assessment. Statistical analysis was done with the help of Medcalc- "medcalc®version 9.2" and GraphPad – "GraphPad Prism 8 version".

OBSERVATION AND RESULTS

Sthaulya has been mentioned in detail in *Samhitas* along with aetiology, etiopathogenesis, symptoms, complications, treatment, diet and lifestyle advice. *Charak Samhita* has mentioned *Sthaulya* in Ch. Su. 21 – *Asthau-Nindita-Purush,*[11] *Sushrut Samhita* has mentioned *Sthaulya* in Su. Su. 15 *Dosha-Dhatu-Mala-kshya-Vriddhi Vigyaniya,*[12] *Ashtang Hriday* has mentioned AH.Su. 14 – *Dwividha-upakramaniya*,[13] *Ashtang Sangrah* has mentioned in AS.Su. 24 – *Dwividha-Upakramaniya,*[14] *Madhav Nidaan* has mentioned in Chapter 34- *Medoroga Nidanam*,[15] *Sharangdhar* has mentioned in Chapter 7 – *Rogaganana*,[16] *Bhav Prakash* has mentioned in Chapter 39 – *Sthaulya Adhikar,*[17] *Bhel* has mentioned *Sthaulya* in Chapter 11- *Samshanparighniya*,[18] *Chakradatt* has mentioned in Chapter 36- Treatment of *Sthaulya*,[19] *Vangasen* has mentioned in Chapter 42 – *Sthaulya*,[20] *Bhaishajya Ratnavali* has mentioned in Chapter 39 – *Medorog Chikitsa Prakaran*,[21]

In this series of 30 patients of *Sthaulya* maximum patients 13 were belong to age group of 41-50 years, 10 patients were belong to 20-30 years, 07 patients belong to age group of 31-40 years. Maximum number of patients were female 18 (60.00%) and remaining 12 (40.00%) patients were male. The numbers of patients from other gender were zero. 9 patients were Students, 08 were from Service, 08 patients were House Wives and 05 were from Business.

Maximum number of patients i.e. 24 (80.00%) were found Hindu in religion. Only 06 patient (20.00%) were Muslims. Maximum numbers of patients were found married during study i.e. 20 (66.66%) and rest 10 (33.33%) patients were un-married. 24 patients were vegetarian while remaining 06 patients were taking mixed diet. Maximum number of patients i.e. 17 (56.66%) came from medium socio-economic status, 13 (43.33%) patients came from rich socio-economic status. 10 patients were post-graduates,12 graduate and 08 were higher secondary passed outs. maximum patients 18 had good appetite and 12 had moderate appetite. 14 had *Adhyashana* dietary habit, followed by 08 had *Samshana* dietary habit and rest of 08 patients had *Vishamashana* dietary habit. 11 were addicted to tea, followed by 06 patients addicted to tea, coffee, then 05 were not addicted, then 03 patients were addicted to tea, smoking and coffee each, then 2 patients were addicted to alcohol. 13 patients had regular bowel habit followed by 10 had constipated bowel habit and then 07 patients had irregular bowel habit. 18 had proper sleep and 12 patients had excessive sleep nature. The maximum number of patients were found with *Madhyam Koshtha* 12, 10 patients were found with *Krura Koshtha* and 08 patients were reported of *Mridu Koshtha.* 14 patients were having *Tikshanagni,* 12 patients were having *Madhayama agni,* 04 patients were having *Vishamagni.* On assessing *Prakruti,* it was found that maximum 19 patients were of *VataKapha Prakruti,* 03 patients were of *VataPitta Prakruti* and 08 were of *KaphaPitta Prakruti*. 25 patients were of *Madhyama Pramana* and rest 10 patients were of *Sama Pramana*. 15 were of *Madhyama Satva*, followed by 10 of *Avara Satva* and then 05 of *Pravara Satva*. 24 were having the Graduall onset of disease and only 06 were having Insidious type onset of disease. While considering the chronicity maximum number of 12 patients were afflicted from upto one year, 10 patients were suffering from 2 to 5 years duration,07 patients were suffering from 6 to 10 years of duration and 01 patients was suffering from 11-15 years duration. 16 patients were having sitting jobs and 14 were having moderate nature of work. 25patients had no positive familial history and remaining 05 patients were having the familial history of this disease. 18 patients had *Madhyama Ahara Shakti* and 12 had *Pravra Ahara Shakti.* 16 patients had *Madhyama Vyayama Shakti* and 14 had *Avara Vyayama Shakti.* 20 patients were of *Meda Sara* and 10 were of *Mansa Sara*.

❖ ***Chala Sphika Udara Stana*** -3 patient were in grade 1, 06 patients were in grade 2, 11 were in grade 3, 10 were in grade 4. ***Alasya-*** 05 patients were from grade 1, 07 were from grade 2, 14 from grade 3, 04 were from grade 4. ***Daurbalyata*** -01 patients were from grade 1, 09 were fromm grade 2, 15 were from grade 3 and 05 were from grade 4.
Swedadhikyata -07 patients were from grade 1, 09 were from grade 2, 08 were from grade 3, 06 were from grade 4. ***Daurgandhyta*** -03 patient was from grade 0, 07 were from grade 1, 09 were from grade 2, 10 were from grade 3and 1 were from grade 4.

Kshudarshwasa-1 patient was from grade 0, 07 were from grade 1, 14 from grade 2, 07 were efrom grade 3 and 1 was from grade 4. ***Atinidra*** -03 were from grade 1, 10 were from grade 2, 12 were from grade 3and 05 were from grade 4. ***Atipipasa*** -05 were from grade 1, 10 were from grade 2, 13 were from grade 3and 02 were from grade 4.

KSHUDATIMATRAM-1 patient was from grade 0, 07 were from grade 1, 14 from grade 2, 07 were from grade 3 and 1 was from grade 4.

❖ **Body weight**-3 patients were having 65 to 74 kgs weight and 105 to 114 and 115 to 124 kgs weight, 08 patients were having weight between 85 to 94 kgs, 07 patients were having weight between 95 to 104 kgs, 02 patients were having weighjt more than 125 kgs. **BMI-**10 patients were having BMI 25 to 30, 11 patients were having 31 to 35 and 09 patients were having more than 35. **Waist hip ratio-**03 patients were having waist hip ratio between 0.80 to 0.85, 03 patients were having between 0.86 to 0.90, 16 patients were having between 0.91 to 0.95, 05 patients were having between 0.96 to 1.00, 03 patients were having more than 1. **Skin fold thickness-**06 patients were having skin fold thickness between 3 to 3.9, 10 were having between 4 to 4.9, 07 were having 5 to 5.9 and 6 to 6.9 each. **Lipid profile-**

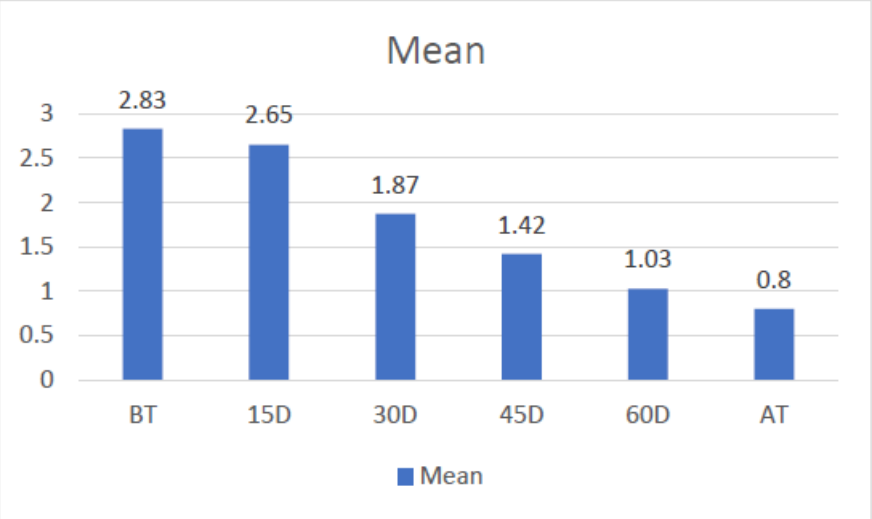
mean of S. cholesterol of 30 patients was 162.67 mg/dl, mean of S. triglyceride of 30 patients was 119.58 mg/dl, mean of HDL of 30 patients was 50.87 mg/dl, mean of LDL of 30 patients was 103.31 mg/dl and mean of VLDL of 30 patients was 24.42 mg/dl.

❖ **EFFECT ON SYMPTOMS OF *CHALA SPHIKA UDARA STANA*.**

Effect on *chala sphika udara stana*

Chala Sphika Udara Stana	Mean	SD	% Change
BT	2.83	1.39	-
15D	2.65	1.17	22.36
30D	1.87	1.07	34.12
45D	1.42	0.97	52.12
60D	1.03	0.81	63.53
AT	0.80	0.78	65.55

Initial mean rank for ***Chala Sphika Udara Stana*** was 2.83, which was lowered to 1.87 after day 30, 1.03 after day 60 and 0.80 after treatment.

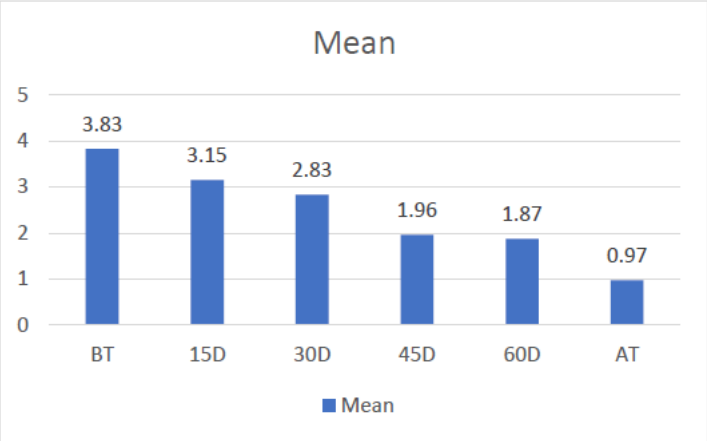


❖ **EFFECT ON *ALASYA***

Effect on symptoms of *Alasya*

Alasya	Mean	SD	% Change
BT	3.83	1.02	-
15D	3.15	0.96	17.98
30D	2.83	0.87	26.09
45D	1.96	0.78	39.85
60D	1.87	0.73	51.30
AT	0.97	0.65	68.26

Initial mean rank for ***Alasya*** was 3.83, which was lowered to 2.83 after day 30, 1.87 after day 60 and 0.97 after treatment.

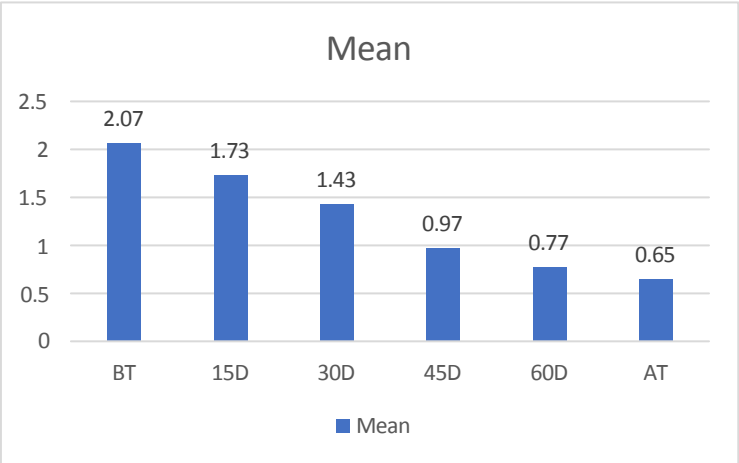


❖ EFFECT ON *DOURBALAYATA*

Effect on symptoms of *Daurbalyata*

Daurbalyata	Mean	SD	% Change
BT	2.07	1.72	-
15D	1.73	1.56	23.58
30D	1.43	1.33	30.65
45D	0.97	0.94	49.56
60D	0.77	0.77	62.90
AT	0.65	0.66	63.87

Initial mean rank for ***Daurbalya*** was 2.07, which was lowered to 1.43 after day 30, 0.77 after day 60 and 0.65 after treatment.

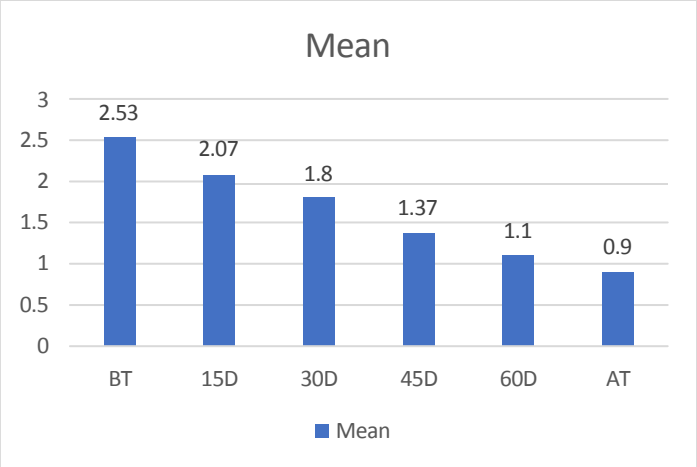


❖ EFFECT ON *SWEDADHIKYATA*

Effect on symptoms of *Swedadhikyata*

Swedadhikyata	Mean	SD	% Change
BT	2.53	1.46	-
15D	2.07	1.35	21.24
30D	1.80	1.21	28.95
45D	1.37	1.04	44.89
60D	1.10	0.92	56.58
AT	0.90	0.87	66.32

Initial mean rank for ***Swedadhikyata*** was 2.53, which was lowered to 1.80 after day 30, 1.10 after day 60 and 0.90 after treatment.

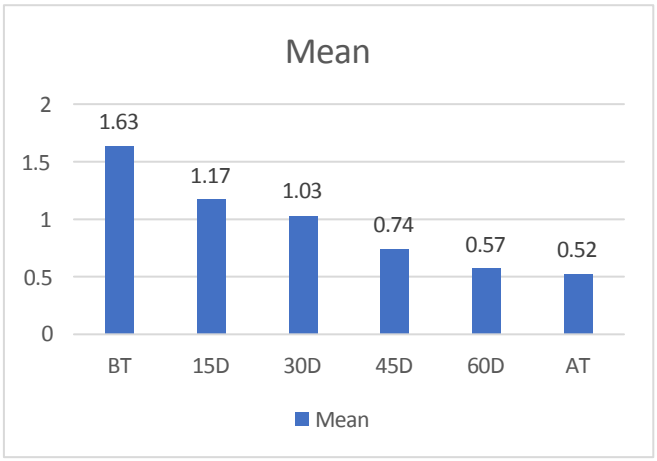


❖ **EFFECT ON *DAURGANDHYTA***

Effect on symptoms of *Daurgandhyta*

Daurgandhyta	**Mean**	**SD**	**% Change**
BT	1.63	1.43	-
15D	1.17	1.26	22.78
30D	1.03	1.10	36.73
45D	0.74	0.87	49.85
60D	0.57	0.68	65.31
AT	0.52	0.63	67.51

Initial mean rank for ***Daurgandhyta*** was 1.63, which was lowered to 1.03 after day 30, 0.57 after day 60 and 0.52 after treatment.

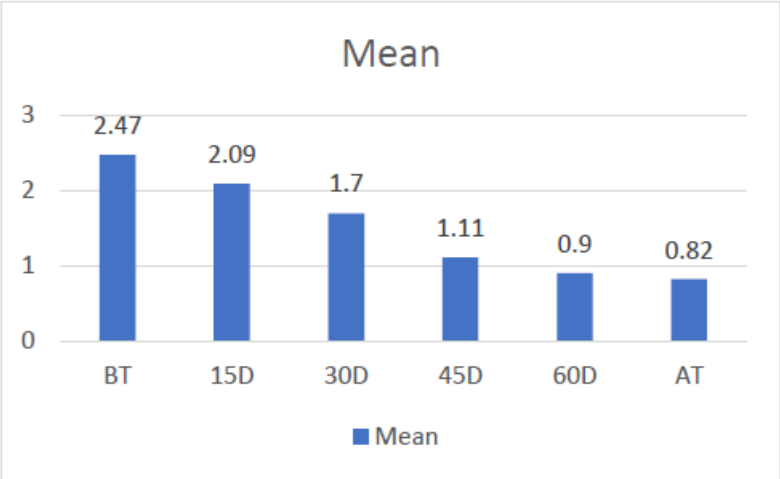


❖ **EFFECT ON *KSHUDRASHWASA***

Effect on symptoms of *Kshudrashwasa*

Kshudrashwasa	**Mean**	**SD**	**% Change**
BT	2.47	1.38	-
15D	2.09	1.21	22.87
30D	1.70	1.12	31.08
45D	1.11	0.93	51.32
60D	0.90	0.88	63.51
AT	0.82	0.80	65.78

Initial mean rank for ***Kshudrashwasa*** was 2.47, which was lowered to 1.70 after day 30, 0.90 after day 60 and 0.82 after treatment.

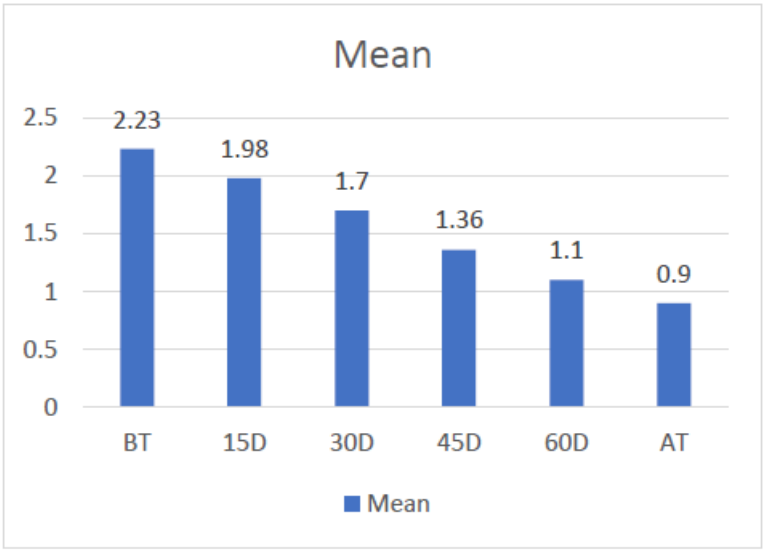


❖ **EFFECT ON *ATINIDRA***

Table: Effect on symptoms of *Atinidra.*

Atinidra	**Mean**	**SD**	**% Change**
BT	2.23	1.43	-
15D	1.98	1.28	14.87
30D	1.70	1.12	23.88
45D	1.36	1.01	39.54
60D	1.10	0.84	50.75
AT	0.90	0.78	67.61

Initial mean rank for ***Atinidra*** was 2.23, which was lowered to 1.70 after day 30, 1.10 after day 60 and 0.90 after treatment.

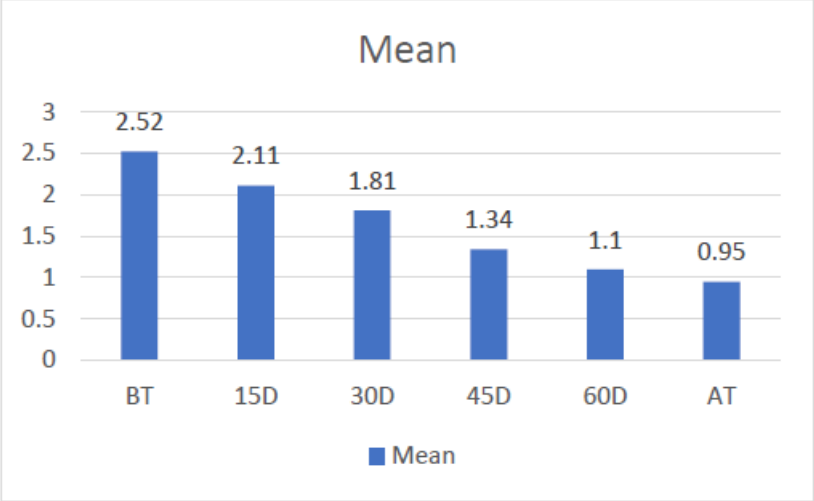


❖ **EFFECT ON *ATIPIPASA***

Effect on symptoms of *Atipipasa*

Atipipasa	**Mean**	**SD**	**% Change**
BT	2.52	1.46	-
15D	2.11	1.32	19.54
30D	1.81	1.21	28.95
45D	1.34	1.05	42.78
60D	1.10	0.92	56.58
AT	0.95	0.87	64.32

Initial mean rank for ***Atipipasa*** was 2.52, which was lowered to 1.81 after day 30, 1.10 after day 60 and 0.95 after treatment.

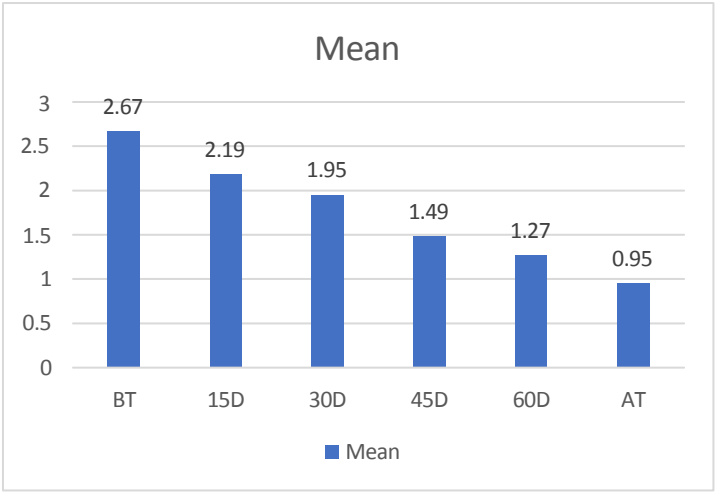


❖ **EFFECT ON *KSHUATIMATRAM*-**

Effect on symptoms of *Kshudatimatram*

Kshudatimatram	**Mean**	**SD**	**% Change**
BT	2.67	1.73	-
15D	2.19	1.56	18.66
30D	1.95	1.35	29.83
45D	1.49	1.04	33.87
60D	1.27	0.98	58.78
AT	0.95	0.86	65.42

Initial mean rank for ***Kshudatimatram*** was 2.67, which was lowered to 1.95 after day 30, 1.27 after day 60 and 0.95 after treatment.



❖ **SUBJECTIVE PARAMETERS**

Table: Defining subjective parameters before and after treatment.

Subjective Parameters	**Mean**		**Median**		**SD**		**Wilcoxon W**	**P-Value**	**% Effect**	**Result**
	BT	**AT**	**BT**	**AT**	**BT**	**AT**				
Chala sphika Udara Stana	2.83	0.80	3.00	0.00	1.39	0.78	-4.818[b]	0.0000388	65.55	S
Alasya	3.83	0.97	2.00	1.00	1.02	0.65	-4.971[b]	0.0000067	68.26	S
Daurbalya	2.07	0.65	2.00	0.00	1.72	0.66	-4.970[b]	0.0000175	63.87	S
Swedadhikya	2.53	0.90	3.00	0.00	1.46	0.87	-4.743[b]	0.0000556	66.32	S
Daurgandhyta	1.63	0.52	1.00	1.00	1.43	0.63	-4.384[b]	0.0000417	67.51	S

Kshudrashwasa	2.47	0.82	2.00	1.00	1.38	0.80	-4.765[b]	0.000085	65.78	S
Atinidra	2.23	0.90	3.00	1.00	1.43	0.78	-4.507[b]	0.0000658	67.61	S
Atipipasa	2.52	0.95	2.00	1.00	1.43	0.87	-4.954[b]	0.0000837	64.32	S
Kshudatimatram	2.67	0.95	2.00	1.00	1.73	0.86	-4.954[b]	0.0000837	65.42	S

Since observations are on ordinal scale (gradations), we have used Wilcoxon Signed Rank Test to test efficacy in parameters. From above table, we can observe that P-Value for all parameters is less than 0.001. Hence, we can conclude that effect observed in all subjective parameters is significant.

❖ OBJECTIVE PARAMETERS

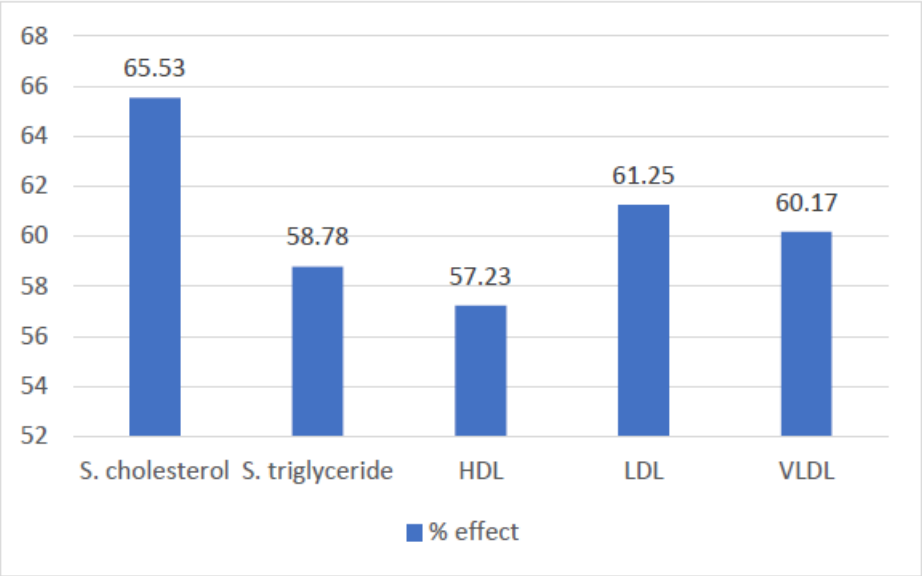
Table: Defining objective parameters before and after treatment.

Objective parameters	Mean		Median		SD		Wilcoxon W	P-Value	% Effect	Result
	BT	AT	BT	AT	BT	AT				
Body weight	1.83	0.63	2.00	0.00	0.79	1.00	-4.526[b]	0.00000601	65.45	S
BMI	1.74	0.68	2.00	0.00	0.82	1.02	-4.634[b]	0.00000856	62.54	S
Waist hip ratio	1.93	0.85	2.00	0.00	0.87	1.14	-4.785[b]	0.0000723	61.89	S
Skin fold thickness	1.53	0.63	2.00	0.00	0.97	0.96	-4.208[b]	0.00002576	58.70	S

Since observations are on ordinal scale (gradations), we have used Wilcoxon Signed Rank Test to test efficacy in parameters. From above table, we can observe that P-Value for all parameters is less than 0.001. Hence, we can conclude that effect observed in all objective parameters is significant.

❖ EFFECT OF THERAPY ON LIPID PROFILE

Lipid profile (mg/dl)	Mean	S.D.	% effect
S. cholesterol	162.67	39.50	65.53
S. triglyceride	119.58	48.45	58.78
HDL	50.87	18.12	57.23
LDL	103.31	32.59	61.25
VLDL	24.42	09.56	60.17



❖ OVERALL EFFECT OF THERAPY

Overall effect of therapy

Overall Effect	No of Patients	Percentage
Complete Improvement	0	0.00%
Marked Improvement	12	40.00%
Moderate Improvement	14	46.66%
Mild Improvement	04	13.33%
Unchanged	0	0.00%
TOTAL	30	100.00%

On the basis of the percentage of effect of relief pattern adopted, the effect of therapy had been assessed. Out of 30 patients 12 patients were marked improvement and 14 patients were moderate improvement and 4 patients were in mild improvement after the completion of the course as well as follow up period.

DISCUSSION

❖ ***Chala Sphika Udara Stana***

Rasanjana provided significant ($p<0.0001$) results in *Chala Sphika Udara Stana* with percentage of relief by 68.26% after the treatment. When the after-treatment data of *Chala Sphika Udara Stana* was analyzed, it showed p value ($p<0.0001$) with significant results. That *Rasanjana* was effective in *Chala Sphika Udara Stana*. No severe adverse effects were reported by any patient.

- ❖ ***Daurbalya-*** The mean rank of *Daurbalya* **BT** was 2.07 which was reduced to 0.65 **AT**, at $p<.05$ shows significant result.
- ❖ ***Swedadhikya-*** The mean rank of *Swedadhikya* **BT** was 2.53 which was reduced to 0.90 **AT**, at $p<.05$ shows significant result.
- ❖ ***Daurgandhyta-*** The mean rank of *Daurgandhyta* **BT** was 1.63 which was reduced to 0.52 **AT**, at $p<.05$ shows significant result.
- ❖ ***Kshudrashwasa-*** The mean rank of *Kshudrashwasa* **BT** was 2.47 which was reduced to 0.82 **AT**, at $p<.05$ shows significant result.
- ❖ ***Atinidra-*** The mean rank of *Atinidra* **BT** was 2.23 which was reduced to 0.90 **AT**, at $p<.05$ shows significant result.
- ❖ ***Atipipasa-*** The mean rank of *Atipipasa* **BT** was 2.52 which was reduced to 0.95 **AT**, at $p<.05$ shows significant result.

To Sum Up: Statistically significant improvement was noticed in *Chala Sphika Udara Stana*, *Alasya*, *Daurbalya*, *Swedadhikya*, *Atinidra*, *Atipipasa*, after treatment. Wilcoxon signed rank test (P value <.016) showed improvements in mean at all three intervals.

- **DISCUSSION ON EFFECT OF THERAPY ON OBJECTIVE PARAMETERS**

❖ **Body weight -**The mean rank of Body weight **BT** was 1.83 which was reduced to 0.63 **AT**, at $p<.05$ shows significant result.

❖ **BMI-**The mean rank of BMI **BT** was 1.74 which was reduced to 0.68 **AT**, at $p<.05$ shows significant result.

❖ **Waist Hip Ratio-** The mean rank of Waist Hip Ratio **BT** was 1.93 which was reduced to 0.85 **AT**, at $p<.05$ shows significant result.

❖ **Skin fold thickness-** The mean rank of Skin fold thickness **BT** was 1.53 which was reduced to 0.63 **AT**, at $p<.05$ shows significant result.

- **TOTAL EFFECT OF THERAPY**

By observing the percentage of difference in each individual after the treatment, among 30 subjects 12 got marked improvements in symptoms, 14 got moderate improvements and 04 got mild improvements.

CONCLUSION

Obesity cannot be managed without making lifestyle changes. The main cause of obesity is poor diet preferences and sedentary lifestyle. *Sthaulya* depends on *ahara, nidra and rasa dhatu* and therefore *Nidaan parivarjana* remains essential factor in treatment. *Rasanjan* as per ayurvedic principles, its *Katu, tikta rasa, ushna veerya, katu vipaka, Tikshna laghu guna, chedana and lekhana karma* is helpful in management of *Sthaulya. Rasanjan* when combined with diet and exercise provides better results in *Sthaulya* rather than diet and exercise only.

Conflict Of Interest

The authors have no conflicts of interest regarding this investigation**.**

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