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RANDOMIZED CONTROLLED CLINICAL TRIAL TO ASSESS THE EFFECTIVENESS OF HARIDRADI TABLET AND NAVAKA GUGGULU TABLET IN THE MANAGEMENT OF OBESITY

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ABSTRACT

Obesity is a major risk factor in the development of chronic non communicable diseases like diabetes, hypertension and etc. The emergence of this disease as a public health problem indicates the need of prevention. Ayurveda offers natural and effective remedies which is cost effective and helpful in prevention of the disease. Objectives of the study was to evaluate the clinical effectiveness of Haridradi tablet and Navaka Guggulu tablet in management of Atisthoulya (obesity). A total of 30 samples were selected and randomly divided into two groups, Group A (Haridradi tablet) and Group B (Navaka Guggulu tablet) each comprising of 15 patients each. The patients of both the group were given with 1-gram tablet twice a day with lukewarm water for a period of 30 days. Haridradi tablet showed good results in reducing the weight from 85.8kg to 83.2kg with a mean difference of 2.6kg. The other benefits observed with administration of Haridradi tablet were on reducing the waist circumference by 2.4cm mean reduction and abdominal circumference by 2.16 mean reduction. Other associated symptoms of obesity got reduced significantly. The drugs like Haridra, Daruharidra, Prisniparni, Kutaja and Madhuyasti present in the tablet has kapha-medhohara properties along with Lekhaneeya and deepaneeya action. They work by the principle of Guru cha Atarpana which regulates the hunger and satiety centre there by regulates the energy intake of a person. Weight was reduced markedly in both Haridradi group and Navaka Guggulu group. The result suggests majority of the parameters showed significant results in both the groups. However, there was not much difference in the results between the groups.

Keywords: Haridradi tablet, Navaka Guggulu tablet, Obesity, Sthoulya

INTRODUCTION

The World Health Report of World Health Organization listed obesity under the ten top selected risks to the health.[1] Obesity is one of the burning problems globally as it will hamper the different systems in the body.[2] An obese person is always prone to land up in complications like dyslipidemia, hypertension, coronary heart disease, diabetes mellitus, osteoarthritis, infertility, impotency as well as psychological disorders like stress, anxiety, depression, etc. It is not only a condition of the deposition of the fat in the areolar tissues but it is a condition in which the utilization of the collected fat is hampered. This is the reason why the treatment of it is highly difficult.

Obesity is a global epidemic, which is increasing due to sedentary lifestyle and improved socio-economic conditions.[3] According to W.H.O, overweight and obesity is defined as abnormal or excessive fat accumulation that may impair health.[4] The recent statistical data shows that the worldwide prevelance of obesity is around 400 million with high rares among women than men.[5] It has reached epidemic proportions in India in the 21st century, with morbid obesity affecting 5% of the country's population.[6] In India 5.5% of male and 12.6% of female are obese and condition is more in urban population than among rural population.[7] It also poses a major risk for chronic diseases, diabetes, musculoskeletal disorders, some cancers and mainly heart disease and stroke, which were the leading cause of death in 2008. It not only affects the health and life of the person but also the country's economy. It is frequently blamed on ingestion of heavy and over food, endocrine factors, body built or heredity etc. BMI (Body Mass Index) more than 27 indicate increasing risk of health.[8] Treatment of obesity is difficult without the cooperation of patient. Many Medical and other related research institutions are making efforts to find a reliable remedy for this burning problem. Many theories have been put forward with many new hypotheses describing the different aspects obesity. In spite of advanced technology and researches, the modern medicine is failing to give the best result for obesity, due to its multi-factorial nature. This failure made the people to look anxiously towards the ancient medical science like Ayurveda for better management.[9]

Atisthoulya (obesity) is one among the major diseases that falls under the category of *Santharpanajanya vyadhi* (nutritional disorder).[10] In Ayurveda, Sthoulya has been dealt by different Acharyas regarding its causes, signs and symptoms, complications, prognosis and management.[9] Acharya Charaka has described it as one among the Ashtanindita (eight despicable persons) and mentioned different principles of management.[11] While Sushruta considers Sthoola as sadatura because Sthoulya needs regular and continuous treatment and so prevention is the best way of management.[9] The disease Sthoulya is fatal unless it is managed properly as it can produce ashta Sthoulya doshas. The early and prompt management is nothing but secondary prevention. Whereas implementing Udvartana, Shodhana as per ritu, adopting Ahara vidhi visheshayatana etc which are mentioned in Swasthavritha constitutes primary prevention. The line of management is atarparna,[12] where ushna, rooksha-teekshna quality and, kaphaharana, medoharana action play a role. Haridradi gana- which comprises Haridra, Daruharidra,

Madhuyasti, Prisniparni and Kutaja is kapha-medohara.[13] It is in need of the hour to develop economic, easily available as well as efficacious medicine. Drugs in haridradi gana are easily available, cost effective. Thus this gana is considered for the assessment of its efficacy in managing Athisthoulya in this study.

The study conducted in 2013-15 to evaluate the efficacy of Haridradi tablet in the management of Atisthoulya in our institution which showed encouraging results. No study is conducted to evaluate the efficacy of Haridradi tablet in Atisthoulya, which is having guru cha Atarpana property. Considering its cost efficiency and easy usage on regular basis the preventive measure of Atisthoulya was planned by administering Haridradi tablet. Keeping in view the above concepts, to document and analyze the preventive aspect of Atisthoulya through Haridradi tablet for statistical interpretation, this study was undertaken.

MATERIALS AND METHODS

Objectives

To evaluate the clinical effectiveness of Haridradi Tablet in the management of obesity.

To evaluate the clinical effectiveness of Navaka guggulu[14] in the management of obesity.

To compare the clinical effectiveness of Haridradi Tablet and Navaka guggulu in management of obesity.

Source of data: Patients were selected successively from the outpatient department of Kaumarabhritya, Shri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan. Ethics clearance was obtained from Institutional Ethic committee of SDM College of Ayurveda and Hospital, Hassan (IEC No. SDMCAH/IEC/56/13-14). The detail clinical history was taken and examination was done as per case proforma prepared for this purpose.

Diagnostic criteria: Diagnosis were made on the basis of symptoms of obesity i.e. atikshuda, atipipasa, atisweda, atinidra, kshudra swasa/alpa swasa, alasya/utsaha hani, daurbalya/alpa vyayama, daurgandhya and chala sphiga udara stana.

Inclusion criteria: The patients within the age group of 16-60 years with BMI > 30 kg/m^2 and are ready to sign informed consent form will be recruited into the trial.

Exclusion criteria: The patients with BMI <30kg/m^2, obese due to secondary cause, lactating mother, pregnant women, hypertension, diabetes mellitus, PCOD and thyroid disorders will be excluded.

Research design: The study was a comparative study with pre-test and post-test design. A total of 30 samples were selected and randomly divided into two groups – Group A (Haridradi tablet group) and Group B (Navaka Guggulu tablet group) each comprising of 15 patients each. The patients of both the group were given with 1 gram tablet twice a day with lukewarm water for a period of 30 days. All the patients were provided with standard diet chart and advised similar dynamic exercises.

Assessment Criteria

Efficacy of treatment was assessed by the changes in the signs and symptoms which are recorded before and after the course of study. The assessment is done with the help of objective parameters and self-graded assessment scale for subjective parameters.

Objective parameters: Weight**,** BMI**,** Circumference of Abdomen, Hip, Mid-arm, Mid-thigh, Waist-hip ratio.

Subjective parameters: Various features of obesity were considered and graded to analyze the results statistically. The gradation adopted is detailed in Table 1.

Follow up: Patients were asked to report once in 15 days from the starting of the course of the study for a total period of one month.

Materials for diagnostic study: To measure circumference of mid-arm, mid-thigh, abdomen and hip, measuring tape was used. A standard Weighing machine was used to measure weight in kg.

Laboratory investigations: The investigations are carried out in "Auto analyzer" method. Lipid profile test was done before and after treatment, in empty stomach. Lipid profile includes - Total cholesterol, HDL, Triglycerides and LDL.

OBSERVATIONS AND RESULTS

Subjects were in the range of 20 to 60 years. In this study, 13**.**3% of subjects were belonged to the age group of 29years. Sex wise distribution shows that maximum number of subjects 60.00% (n=18) were male and rest were female. 90.00% (n=27) were Hindus and 6.66% (n=02) each were Muslims and 3.33% (n=01) were Christians. 50.00% (n=15) were below 12th standard (high school) followed by 40.00% (n=12) subjects were having graduate level education while only 6.66% (n=02) subjects having primary level education and 3.33% (n=01) are illiterate. 83**.**3% **(**n=25**)** belonged to middle class. 63.3% (n=19) were sedentary, 20% (n=06) are active, 13.3% (n=04) were labor, while 3.33% (n=01) were others (students). 60.0% (n=18) were married, while 36.7% (n=11) were unmarried. 83.3% (n=25) who visited the hospital were from Urban, Rest 16.7% (n=05) was from rural place. 83.3% (n=25) were having vatakapha Prakriti. While 13.3% (n=04) subjects were having Kapha Prakriti and 3.33% (n=01) were having pittakapha Prakriti. 96.67% (n=29) subjects were having Madhyama Abhyavaharana Shakti while 3.33% (n=01) subjects were having Pravara Abhyavaharana Shakti. 93.3% (n=28) subjects were having Madhyama Jaranshakti while 6.7% (n=02) subjects were having Pravara Jaranashakti. 76.7% (n=23) subjects were mixed by their food habit and remaining 23.3 % (n=07) subjects were vegetarians. 86.7% (n=26) of subjects were madhyama sara and 13.3% (n=04) were of Pravara Sara Purushas. All subjects belong to madhyama satmya lakshanas. 80% (n=24) subjects were having food thrice daily, whereas 13.3% (n=04) subjects were taking food four times a day and minimum of 6.66% (n=02) subjects were habituated to take food twice a day. 80% (n=24) subjects were constituted with sound sleep followed by 20% (n=06) had disturbed sleep. All the subjects had the complained of Acquired body weight. 73.3% (n=22) had history of increased body weight with duration of 01-05 years, followed by 16.6% (n=05), 6.66 % (n=02), 3.33% (n=01) complained of increased body weight since 6-10 years, 11-15 years and > 15 years' duration respectively.

The mean body weight in Haridradi tablet group was reduced from 85.8kg to 83.23kg with 2.6% of mean improvement. The mean weight of Navaka guggulu tablet group was reduced from 90.14kg to 88.65 kg with 1.49% of mean improvement. Both the groups show significance at the level of P<0.001. The mean BMI in Haridradi tablet group was reduced from 32.93kg/m^2 to 32.04 kg/m^2 with 1.81% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 32.62 kg/m^2

to 32.05 kgm^2 with 1.17% of mean improvement. Both the groups show significance at the level of P<0.001. The mean abdominal circumference in Haridradi tablet group was reduced from 102.77cm to 100.61cm with 1.41% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 103.13cm to 102.06cm with 0.694% of mean improvement. Group A shows significance at p-value .000 while Group B shows significance at p-value .027. The mean waist circumference in Haridradi tablet group was reduced from 105.20cm to 102.80cm with 2.4% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 102.73cm to 101.46cm with 0.827% of mean improvement. Group A shows significance at p-value .000 while Group B shows significance at p-value .011. The mean hip circumference in Haridradi tablet group was reduced from 109.87cm to 108.27cm with 0.975% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 106.60cm to 105.30cm with 0.816% of mean improvement. Group A shows significance at p-value .001 while Group B shows significance at p-value .05. The mean mid right upper arm circumference in Haridradi tablet group was reduced from 31.6cm to 30.31cm with 2.75% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 32.2cm to 31.4cm with 0.8% of mean improvement. Group A shows significance at p-value .000 while Group B shows significance at p-value .041. The mean mid left upper arm circumference in Haridradi tablet group was reduced from 31.27cm to 29.93cm with 2.90% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 31.66cm to 30.8cm with 1.82% of mean improvement. Group A shows significance at p-value .001 while Group B shows significance at p-value .027. The mean right mid-thigh circumference in Haridradi tablet group was reduced from 55.73cm to 54.08 cm with 1.99% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 54.53cm to 53.6cm with 1.14% of mean improvement. Group A shows significance at p-value .000 while Group B shows non- significance at p-value 0.84. The mean left mid-thigh circumference in Haridradi tablet group was reduced from 55.50cm to 53.90cm with 1.94% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 53.66cm to 52.86cm with 0.99% of mean improvement. Group A shows significance at p-value .000 while Group B shows non- significance at p-value 0.118. The mean score serum cholesterol in Haridradi tablet group was reduced from 185.5mg/dl to 180.73mg/dl with 1.72% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 208mg/dl to 206.6mg/dl with 0.67% of mean improvement. Group A shows significance at p-value .038 while Group B shows non- significance at p-value 0.186. The mean serum triglyceride in Haridradi tablet group was reduced from 171.7mg/dl to 168.64mg/dl with 1.19% of mean improvement. The mean score of Navaka guggulu tablet group was reduced from 186.3 mg/dl to 179.9 mg/dl with 2.31% of mean improvement. Both group are not significant at p=value > .05. The mean HDL in Haridradi tablet group was increased from 42.43 mg/dl to 42.98mg/dl with -0.55% of mean improvement. The mean score of Navaka guggulu tablet group was decreased from 43.1mg/dl to 42.2mg/dl with 1.40% mean improvement. Both group shows non-significance at the level of p-value > .05. The mean LDL in Haridradi tablet group was reduced from 107.25 mg/dl to103.35mg/dl with 2.46% of mean improvement. The mean score of Navaka guggulu tablet group was increased from 129.9 mg/dl to 129 mg/dl. Group A shows significance at p-value .011 while Group B shows non-significance at p-value 0.153. The mean VLDL in Haridradi tablet group was reduced from 35.76 mg/dl to 34.40 mg/dl with 2.56% of mean improvement. The mean score of Navaka guggulu tablet group was increased from 37.04 mg/dl to 35.46 mg/dl. Both group shows non-significance at p-value > .05.

The statistical values of unpaired t-test for objective parameters are shown in Table 2. The statistical values of unpaired t-test for subjective parameters such as Atikshuda, Atipipasa, Atisweda, Atinidra, Kshudra swasa, Alasya, Alpavyayama, Dourgandhya and Chala sphik sthana udara are detailed in Tables 3 to 11. Mann - Whitney U Test for subjective parameters between the group is detailed in Table 12.

DISCUSSION

The drugs used in Haridradi tablet are Ushna veerya in general and have shothahara property. They are having the qualities like Laghu, Ruksha, Ushna and teekshna. These characters induce kapha, Meda vilayana mainly by its Ushna and teekshna gunas. The combined effect of action of drugs is responsible for the Meda vilayana. The probable mode of action can be explained like this. The drugs in Haridradi tablet with its Ushna teekshna properties will make Meda vilayana i.e. liquefaction of stored fat into fatty acids. Mainly the triglyceride is converted into fatty acid. This liquefaction is responsible for the movement of fat into the circulation. The circulatory fat is having two options namely, excretion and storage. Since the amount of liquefied fat is more than that of concentration of storable fat, body tries to eliminate it. In the second part, there will be elimination of fat by the liver through bile. Some part of fat present in the bile may get absorbed through enteric re-absorption process but excess quantity will be excreted out.

The Haridradi ganam, Haridra (Curcuma longa Linn) is one among Lekhaniya-Dravya and is having laghu, ruksha, guna, katu rasa and Vata – Kaphagna property. Daruharidra (Berberis aristata Dc) is one among Lekhaniya-Dravya used in Agimandya and is having Kasaya tikta rasa, ruksha guna, and Kaphaghna properties. Madhuyasti (Glycyrrhiza glabra Linn), which is having Chedana (shleshmahara) property. Prisniparni (Uraria picta Desv) is Tridosha samaka, which has Thikta rasa and Laghu guna in its property. Kutaja (Holarrhena antidysentrica Linn), Tridoshaghna (Indrayava), Lekhna, Dipana, Pachana, Ruksha guna, Kapha pitta samaka in properties. Most of the drugs above mentioned have Dipana, Pacana, Kaphahara, Medhohara properties.

Table 1: Gradation of subjective parameters

Domain	Criteria	Grade
Atikshuda	Normal appetite 2-3 times daily	0
	Excess appetite 2-3 times daily	1
	3-4 times daily	2
	4-5 times daily	3
	More than 5 times daily	4
Atipipasa	Normal thirst	0
	Up to 1 liter excess intake of water	1
	1 to 2 liters excess intake of water	2
	2 to 3 liters excess intake of water	3
	More than 3 liters intake of water	4
Atisweda	Sweating after heavy work and fast movement or in hot season	0
	Profuse sweating after moderate work	1
	Sweating after little work and movement	2
	Profuse sweating after little work	3
	Sweating even at rest or in cold season	4
Atinidra	Normal sleep of 6-7 hours per day	0
	Sleep up to 8hrs/day with angagaurava	1
	Sleep up to 8hrs/day with angagaurava & jrimba	2
	Sleep up to 10 h/day with tandra	3
	Sleep up to 10 h/day with tandra	4
Kshudra swasa/Alpa swasa	Dyspnoea after heavy work but releaved soon and upto tolerance	0
	Dyspnoea after moderate works but relieved later and up to tolerance	1
	Dyspnoea after moderate works but relieved later and up to tolerance	2
	Dyspnoea after little work but relieved later and beyond tolerance	3
	Dyspnoea in resting condition	4
Alasya/Utsaha Hani	No alasya	0
	Doing work satisfactorily with late initiation	1
	Doing work unsatisfactorily under mental pressure and takes time	2
	Not starting work on his own responsibility and doing little wok very slowly	3
	Does not take initiation and not want to work even after pressure	4
Daurbalya/Alpa vyayama	Can do routine exercise	0
	Can do moderate exercise without difficulty	1
	Can do only mild exercise	2
	Can do mild exercise with very difficulty	3
	Cannot do even mild exercise	4
Daurgandhya	Absence of bad smell	0
	Occasionally bad smell from the body which removed after bathing	1
	Persistent bad smell limited to close areas difficult to suppress with deodrants	2
	Persistent bad smell felt from long distance and is not suppressed by deodorants	3
	Persistent bad smell felt from long distance even intolerable to the patient himself	4
Chala sphiga udara stana	Absence of chalatva	0
	Little movements (in the areas) after fast movement	1
	Little visible movement (in the areas) even after moderate movement	2
	Movement (in the areas) after mild movements	3
	Movement (in the areas) even after changing posture	4

Table 2: Statistical values of unpaired t-test for objective parameters

Parameter	M.DIFF	SE	t-value	p value	Interpretation
Weight	.47333	.64116	.738	.467	NS
BMI	.30600	.26439	1.157	.257	NS
AC	1.09333	.56866	1.923	.065	NS
WC	1.13333	.57127	1.984	.057	NS
HC	.33333	.71225	.468	.643	NS
WHR	-.00113	.00991	-.114	.910	NS
MUAC(Rt)	.48667	.43620	1.116	.274	NS
MUAC(Lt)	.46667	.47090	.991	.330	NS
MTC(Rt)	.72000	.59470	1.211	.236	NS
MTC(Lt)	.80000	.56695	1.411	.169	NS
Serum cholesterol	3.28667	3.81377	.862	.396	NS
Serum triglyceride	-3.31111	8.29865	-.399	.693	NS
HDL	-1.46667	1.56213	.939	.356	NS
LDL	2.96667	3.12338	.950	.350	NS
VLDL	-.21333	1.68971	-.126	.901	NS

Table 3: Statistical values of Atikshuda

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Atikshuda											
	N	MR	SR	N	MR	SR					
Haridradi tablet	8	4.50	36.00	0	.00	.00	7	15	-2.8	.005	S
Navaka Guggulu	10	5.50	55.00	0	.00	.00	5	5	-3.1	.002	S

Table 4: Statistical values of Atipipasa

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Atipipasa											
	N	MR	SR	N	MR	SR					
Haridradi tablet	10	5.50	55.0	0	.00	.00	5	15	-3.1	.002	S
Navaka guggulu	11	6.00	66.0	0	.00	.00	4	15	-3.2	.001	S

Table 5: Statistical values of Atisweda

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Atisweda											
	N	MR	SR	N	MR	SR					
Haridradi tablet	8	4.50	36.0	0	.00	.00	7	15	-2.8	.005	S
Navaka guggulu	10	5.50	55.0	0	.00	.00	5	15	-3.0	.002	S

Table 6: Statistical values of Atinidra

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Atinidra											
	N	MR	SR	N	MR	SR					
Haridradi tablet	9	5.00	45.00	0	.00	.00	6	15	-2.8	.004	S
Navaka guggulu	12	7	84.00	0	.00	.00	3	15	-3.0	.002	S

Table 7: Statistical values of Kshudra swasa

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Kshudra swasa											
	N	MR	SR	N	MR	SR					
Haridradi tablet	8	4.50	36.00	0	.00	.00	7	15	-2.8	.005	S
Navaka guggulu	8	4.50	36.00	0	.00	.00	7	15	-2.8	.005	S

Table 8: Statistical values of Alasya

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Alasya											
	N	MR	SR	N	MR	SR					
Haridradi tablet	9	5	45.00	0	.00	.00	6	15	-3.0	.003	S
Navaka guggulu	10	5.5	55.00	0	.00	.00	5	15	-3.0	.002	S

Table 9: Statistical values of Alpavyayama

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Alpavyayama											
	N	MR	SR	N	MR	SR					
Haridradi tablet	5	3.00	15.00	0	.00	.00	10	15	-2.2	.025	S
Navaka guggulu	11	6.00	66.00	0	.00	.00	4	15	-3.2	.001	S

Table 10: Statistical values of Dourgandhya

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Dourgandhya											
	N	MR	SR	N	MR	SR					
Haridradi tablet	7	4.00	28.00	0	.00	.00	8	15	-2.6	.008	S
Navaka guggulu	9	5.00	45.00	0	.00	.00	6	15	-3.0	.003	S

Table 11: Statistical values of Chala sphik sthana udara

Parameter	Negative Rank			Positive Rank			Ties	Total	Z-value	P value	Interpretation
Chalasphik stana udara											
	N	MR	SR	N	MR	SR					
Haridradi tablet	5	3.00	15.00	0	.00	.00	10	15	-2.2	.025	S
Navaka guggulu	11	6.00	66.00	0	.00	.00	4	15	-3.3	.001	S

Table 12: Mann.Whitney U-Test for subjective parameters between the group

Null hypothesis	Test	Significance	Result
The distribution of Atishudha_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.539[1]	Retain the null hypothesis
The distribution of Atipippasa_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.624[1]	Retain the null hypothesis
The distribution of Atisveda_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.436[1]	Retain the null hypothesis
The distribution of Atinidra_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.595[1]	Retain the null hypothesis
The distribution of Kshudra swasa_Mean is the same across categories of group	Independent samples Mann - Whitney U test	1.000[1]	Retain the null hypothesis
The distribution of Alasya_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.624[1]	Retain the null hypothesis
The distribution of Alpavyayama_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.050[1]	Retain the null hypothesis
The distribution of Dourgandhya_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.539[1]	Retain the null hypothesis
The distribution of Chala sphik_Mean is the same across categories of group	Independent samples Mann - Whitney U test	0.061[1]	Retain the null hypothesis

CONCLUSION

The increase in prevalence has made obesity a public health problem and this disease is a known risk factor for many chronic non communicable diseases. Hence researches should be aimed to prevent the disease. It is best described in Ayurvedic samhitas. But researches are needed to evaluate these in the modern methodology for better understanding. The definition of the disease is better explained in the classics but assessment is more practical in the contemporary science. The concept of lipid can be included under the concept of Medas as they share most of the similar qualities and properties. The Nidana as mentioned in the classics stands appropriate even in today's developed scientific world. But the significant cause is nothing but adaptation of improper life style pattern. The excess fat accumulates specifically in the regions of Sphik, Sthana and Udara as these places provide larger storable area. The disease should be prevented in the primary and primordial level itself. Otherwise secondary prevention is the only way because the Upadrava of the disease are much more harmful than the obesity and it can even lead to death at an early age. The Aushadha Dana kala as mentioned in the classics was adopted to treat the disease effectively. The obsertabletons on different age groups and sex, reveals that, the disease is more in adolescents and females of menopausal age. The reasons attributed for this is life style changes and hormonal effects. The associated complaints of obesity are not limited only to the complaints mentioned in the classics. The sroto avarodha can lead to any type of disease manifestation and classics have highlighted the prominent complaints. The food and exercises are vital in maintaining madhyama sharira and hence it constitute part and parcel of obese individuals. These act as supportive therapy in the management of Sthoulya. Based on the results obtained from this study, majority of the parameters showed significant results in both the groups. However, there was not much difference in the results between the groups. As a result, both Haridradi tablet and Navaka Guggulu tablet can be adopted as treatment modalities for the management of Obesity.

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