EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES

http://www.ejbps.com

ISSN 2349-8870
Volume: 6
Issue: 1
287-292
Year: 2019

EFFECT OF MOTH *(CYPERUS ROTUNDUS* LINN.) AND NAGARMOTH *(CYPERUS SCARIOUSUS* LINN.) IN THE MANAGEMENT OF STHAULYA (~OBESITY)

[1]Dr. Mehul Barai, [2]*Dr. Amin Hetalben and [3]Dr. Dhara Barai,

[1]Research Scholar, Parul Institute of Ayurveda, Parul University, Vadodara.
[2]Research Officer, Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Government of India, Kolkata.
[3]Ayurvedic Consultant, Meghadhara Ayurvedic Hospital, Jamnagar.

***Corresponding Author: Dr. Amin Hetalben**
Research Officer, Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Government of India, Kolkata.

Article Received on 28/10/2018 **Article Revised on 18/11/2018** **Article Accepted on 08/12/2018**

ABSTRACT
Present study is planned to evaluate clinical efficacy and compare both the varieties of Motha *(Cyperus Rotundus* Linn.) & Nagarmotha *(Cyperus Scariousus* Linn.) on management of Sthaulya, clinically, in order to find out better option. Selection and division of volunteers was done by random sampling method. Total Patients screened- 35, among them 30 patients were having classical signs and symptoms of *Sthaulya* were registered while 30 patients were excluded as they were not fulfilling the inclusion criteria. The present study is aim to evaluate clinical efficacy and compare both the varieties of *Motha (Cyperus Rotundus* Linn.) and *Nagarmotha (Cyperus Scariousus* Linn.) on management of Sthaulya. All the subjects showed improvement in *Angagauravta*, Ayatoapchya, Atipipasa, Gatrasad, Atiksudha and Nindra in group B as verses group A which showed only 87.35%, 65.37%, 71.99%, 92.30%, 50 and 84.61% respectively. This difference may be due to Nagarmotha. Motha has shown more significant result like Chala Sphik Udar Stana, Ayatoupachaya, Snigdhangata seen more significant than Nagarmotha. Comparison of BMI between two groups showed that reduction in BMI of group A is significant at 7.60% whereas that of group B is at 7.01%. The study concluded that comparative there is not much difference found in both verities but individually in group *Nagarmotha (Cyperus Scariousus* Linn.) found slightly better difference than *Motha (Cyperus Rotundus* Linn.).

KEYWORDS: Moth, Nagarmoth, Obesity, *Cyperus Scariousus* Linn., *Cyperus Rotundus* Linn.

INTRODUCTION
Chronic diet-related diseases are on rise around the world due to new lifestyles and eating habits. So, studies about health promotion and its related factors certainly need to be conducted. Change in the life style is becoming major strategy for prevention of non-communicable diseases[1] and for promotion of health. Most of these non communicable diseases share common preventable risk factors, such as tobacco use, high alcohol consumption, anxiety, raised cholesterol level, and sedentary life style. Lifestyle diseases like hypertension, diabetes mellitus and obesity are the major risk factors for the development of CVD.[2] Obesity is psychosomatic and much common in the Jamnagar city therefore they are selected. *Medovriddhi* is *Kapha* and *Tamas Pradhana*. Therefore, this disease is selected to assess the *Pradhana Sharira* and *Manas Prakriti* of patients of Obesity.

Sthaulya (Obesity) is a chronic disease that is highly prevalent and that poses a serious risk for the development of diabetes mellitus, hypertension, heart disease and certain forms of cancer.[1] This can be very much co-related to the concept of *Sthaulya* explained in Ayu According to W.H.O currently 1.9 billion adults worldwide were overweight of these over 600 million were obese in 2014.[3] While describing the treatment of *Sthaulya*, *Acharya Charaka* emphasized on the use of lekhaneeya dravyas for the management of Sthaulya.[4] Present study is planned to evaluate clinical efficacy and compare both the varieties of Motha & Nagarmotha on management of Sthaulya, clinically, in order to find out better option. In present study, selection and division of volunteers was done by random sampling method. The present study is aim to evaluate clinical efficacy and compare both the varieties of *Motha (Cyperus Rotundus* Linn.) & *Nagarmotha (Cyperus Scariousus* Linn.) on management of Sthaulya.

MATERIALS AND METHODS
Material for the study were patients and drug. Patients attending the O.P.D. and I.P.D. of department of Dravyaguna, Parul Ayurved hospital, Vadodara irrespective of sex, religion etc. complaining of classical

signs and symptoms of *Sthaulya* and fulfilling the criteria of inclusion were selected for the present study. A detailed history was taken and specially prepared Performa based on *Ayurvedic* guidelines was filled. Informed consent was taken from the patient before including them in the trial. This project has been cleared by Institutional ethics committee vide its letter No.- PIA/ IECHR/ 25/ 2014-15/ DRAVYA/ 006. This trial is registered in Clinical Trial Registry of India (CTRI) No. - CTRI/2017/03/008234.

Total Assessment of the Therapy was made on the basis of relief in the signs and symptoms as well as objective criteria like weight, BMI, Skin fold Thickness & Body Circumference. On the basis of before and after treatment score, the statistical analysis was carried out using below mentioned statistical test. For single group: Students paired 't' test -Parametric data and To compare the effect of therapies Unpaired 't' test -Parametric data. Scoring pattern was adopted for the assessment of sign and symptoms. (Table 2) Objective criteria was assessed mainly on the basis of Anthropometric assessment before starting the treatment and after completion of treatment in terms of percentage relief and statistical evaluations. Anthropometric assessments were done before & after the treatment using weighing machine & measurement tape. For the present study the girth measurements of certain regions using measuring tape before and after the treatment were also carried out. The girth measurement of following areas where generally more adiposity found was taken into consideration.1. Neck: at the level of Thyroid cartilage, 2. Chest: in normal expansion at the level of nipple, 3. Abdomen: at the level of umbilicus, 4. Hip: at the level of highest point of distension of buttock, 5. Mid arm: mid of the arm between shoulder joint and elbow joint, 6 Fore arm: mid of the fore arm between elbow joint and wrist joint, 7. Mid-thigh: mid of the thigh between pelvic and knee joint, 8. Mid-calf: mid of the calf between knee joint and ankle joint.

The effective of therapy on body fat was assessed through measuring the skin fold thickness by Vernier calipers before and after the treatment in some particular areas like; 1. Skin fold thickness of the middle portion of the Biceps muscle, 2. Skin fold thickness of the middle portion of the Triceps muscle, 3. Skin fold thickness of the inferior portion of the scapula, 4. Skin fold thickness of the abdomen and 5. Skin fold thickness of the middle portion of the supra iliac region.

The skin fold measurement was carried out bilaterally after exposing the skin properly in the above mentioned region. The superficial skin along with subcutaneous fat but except muscles a clinch was made and the proportionate, which is stretched as skin fold was measured by placing it between two points of Vernier Calipers.

Inclusion Criteria

Patients between the age group of 18 years to 60 years and having classical signs and symptoms of *Sthaulya* i.e. *ChalaSphik-Udara-Stana, Angaurava, Swedadhikya, Kshudhadhikya, Pipasadhikya, KshudraShwasa, Nidradhikya etc.* were selected, irrespective of sex, religion etc. from the O.P.D. and I.P.D. of Parul Ayurved Hospital Vadodara. Detailed clinical history was taken on specially prepared research proforma and filled in the record of B.T. and A.T. data for the statistical study. B.M.I. – Patients with BMI >25 Kg/m^2 were included in study.

Exclusion Criteria

Age of patient less than 18 years and more than 60 years. Patients having major illness like cardiac diseases, diabetes mellitus etc. & also the involvement of other systemic disorders. Patients having *Sthauya* due to pregnancy, drug induced, Cushing's syndrome, hypothyroidism, other hormonal disorder and related to any disease.

Sampling Method and Grouping

Each individual was chosen randomly and entirely by chance, such that each individual has the same probability of being chosen at any stage during the sampling process in either group. Patients were randomly divided into below mentioned 2 groups: Group A: *Motha Rhizome Choorna* and Group B: *Nagarmotha Rhizome Choorna.* Patients of both the groups was suggested similar type of *Vyayama* and *Pathya-Apathya*. Dose and posology of both medicines are described as per table 1.

Preparation of *Choorna*

The Crude drugs are taken & cleaned properly specialy Nagarmotha & Motha washed with water dried. Crude drugs powdered in coarse form and kept for drying in oven. Crude drugs coarse form again powdered for making fine powder out of it. The fine powder than filter through 60 number sieve. Fine powder than kept in air tight container.

Duration of Treatment

To assess the efficacy of the drug the present study incorporates a minimum of 60 days medication. Patients were advised to come once in 15 days and changes in the subjective and objective parameters were noted.

Pathya -Apathya

As the disease is directly connected with diet, dietary habits and lifestyle, a detailed explanation regarding the dietary substances was given to all patients and requested them to follow the same. However, they were asked to avoid too oily, cold, sweet, spicy, fatty and carbohydrate rich foods.

RESULTS

The observations made during the clinical study on various factors are shown in tables. In this study, total Patients screened- 35, among them 30 patients were having classical signs and symptoms of *Sthaulya*

(Inclusion criteria) were registered while 30 patients were excluded as they were not fulfilling the inclusion criteria. Patients fulfilling the criteria for selection were included into the study irrespective of their age, sex, religion, etc. They were randomly divided into two groups. Baseline characteristics of patients are as follows. (Table 3) Majority of patients have age between 41-50 years female, Hindu, Housewives, adults, sedentary habits. Distribution according to body weight is as per table 4, Distribution of Patients According to B.M.I. is mentioned in table 5, effect of therapy is given in table 6, Effect of therapy in subjective criteria is mentioned in table 7, Anthropometric measurement effect between Groups are described in table 8, Skin fold thickness effect in both groups are mentioned in table 9, Effect of treatment on weight and BMI between groups is described in table 10.

Tables

Table 1: Dose & Posology.

No.	Subject	Group A	Group B
1.	Dosage form	Choorna of Rhizome	Choorna of Rhizome
2.	Form	Choorna *Nagarmotha (Cyperus Scariousus* Linn.)	Choorna *Motha (Cyperus Rotundus* Linn.).
3.	Dose	6gms/day	6gms/day
4.	Route of administration	Oral	Oral
5.	Time	Empty Stomach Morning & Evening	Empty Stomach Morning & Evening
6.	Duration	60 days	60 Days
7.	Anupana	Luke warm water	Luke warm water

Table 2: Scoring pattern according to parameters.

Parameters	Grade	Description
Bharavriddhi	0	Appropriate weight as per height weight ratio
	1	1-33% more weight as per height weight ratio
	2	34-66% more weight as per height weight ratio
	3	>66% more weight as per height weight ratio
ChalaSphikaUdaraStana (Visible Movement in Hip-Abdomen-Breast)	0	Absence of Chalatva
	1	Little visible movement (in the areas) even after moderate movement
	2	visible movement (in the areas) after mild movement
	3	Movement (in the areas) even after changing posture
Angagaurava (Heaviness in body)	0	No heaviness in body
	1	Feels heaviness in body but it does not hamper routine work
	2	Feels heaviness in body which hamper routine work
	3	Feels heaviness with flabbiness in all over body which hamper the movement of the body
Ayathopachaya(Improper distribution of fat)	0	YathavatUpachaya
	1	Ayathopachaya seen at only one organ (e.g. Udara)
	2	Ayathopachaya seen at two organs (e.g. Udara and Sphik)
	3	Ayathopachaya seen at three or more organs (Udara, Sphik, Stana)
Daurgandhya(Body odour)	0	Absence of bad smell
	1	Occasional bad smell from the body which removed after bathing
	2	Persistent bad smell limited to close areas difficult to suppress with deodorants
	3	Persistent bad smell felt from long distance even intolerable to the patient himself
Atikshudha(Excess hunger)	0	Normal hunger (feel hunger) at 6-8 hours after taking food
	1	Feel hunger after 5-6 hours of taking food
	2	Feel hunger after 4-5 hours of taking food
	3	Feel hunger after 3-4 hours of taking food
Atipipasa(Excess thirst)	0	Normal thirst (1 ½ -2 litters intake water at normal temperature)
	1	2 to 3 litters intake of water
	2	3 to 4 litters intake of water
	3	More than 4 litters intake of water
Kshudrashwasa(Dyspnoea on Exerion)	0	Dyspnoea after heavy work (movement) but relieved within 5 minutes and up to tolerance
	1	Dyspnoea after moderate work but relieved later and up to tolerance
	2	Dyspnoea after little work but relieved later and up to tolerance

	3	Dyspnoea after little work but relieved later and beyond tolerance
Swedadhikya (at normal temperature in normal condition) (Excess sweating)	0	Sweating after heavy work and fast movement or in hot season
	1	Profuse sweating after moderate work and movement
	2	Profuse sweating after little work and movement
	3	Sweating even at rest or in cold season
Nidradhikya(Excess sleep)	0	Normal sleep 6-7 hrs. per day
	1	Sleep up to 8 hours/day with *Angagaurava*
	2	Sleep up to 8 hours/day with *Angagaurava*, *Jrimbha* and *Tandra*
	3	Sleep more than 10 hours/day with above symptoms and *Klama*
Angashaithilya (Flabbiness in the body)	0	No flabbiness in the body
	1	Flabbiness in one anatomical region
	2	Flabbiness in more than one anatomical region which does not cause distress
	3	Flabbiness in all over the body which causes distress to the patient
Gatrasada(Fatigue)	0	No fatigue
	1	Little fatigue in doing hard work
	2	Moderate fatigue in doing routine work
	3	Excessive fatigue even in doing little work
Snigdhangata (oily body luster)	0	Normal *Snigdhata* (lustre)
	1	Oily lustre of body in summer season only
	2	Oily lustre of body in other seasons too
	3	Excessive oily lustre of body in dry season which is removed with difficulty
Alpavyayama (Weakness in exercise)	0	Can do routine exercise
	1	Can do moderate exercise without difficulty
	2	Can do only mild exercise
	3	Cannot do even mild exercise

Table 3: Baseline characteristics.

Baseline characteristics	Total	Percentages
41-50	10	33.33
Female	27	90
Hindu	16	53.33
Housewives	23	76.66
Adult	20	66.66
Gradual onset	28	93.33
Sedentary habits	21	70
Vegetarian	16	53.33
Madhura Rasa Sevan	23	76.66
Snigdha Guna pradhana Ahara Sevan	22	73.33
Water intake after meal	24	80
Visham Agni	11	36.66
Madhyam koshtha	17	56.66
Viruddhashana	19	63.33
Tea and Coffee intake	25	83.33
No exercise	28	93.33
Sedentary work	21	70
Achintana	16	53.33
Kapha- Vataj Prakriti	11	36.66
Rajasapradhana	23	76.66

Table 4: Distribution of Patients according to Body Weight.

Body Weight (Kg)	No. of Patients		Total	Percentage (%)
	Group A	Group B		
61-70	2	3	5	16.66
71-80	2	4	6	20
81-90	5	4	9	30
91-100	6	3	9	30
>100	0	1	1	3.33

Table 5: Distribution of Patients According to B.M.I.

B.M.I. (Kg/m^2)	No. of Patients		Total	Percentage (%)
	Group A	Group B		
>25 – 28	4	1	5	16.66
>28 -30	1	0	1	3.33
>30-33	3	9	12	40
>33->35	7	5	12	40

Table 7: Effect of Therapy in Subjective Criteria.

Criteria	Mean Diff. Group A N=15	Mean Diff. Group B N=15	T	P
Bharavriddhi	0.400	0.467	-0.564	0.582 (NS)
ChalaUdarsphikstana	0.667	0.714	-0.171	0.867 (NS)
Angagaurava	1.4	1.400	0.000	1.000 (NS)
Ayathopachaya	1.133	1.214	-0.326	0.747 (NS)
Daurgandhya	0.833	0.750	0.290	0.779 (NS)
Atikshudha	1.250	0.900	1.209	0.241 (NS)
Atipipasa	1.786	0.500	4.660	<0.001 (S)
Swedadhikya	1.700	0.900	3.394	0.003 (S)
Nidradhikya	1.444	0.222	5.336	<0.001 (S)
Angashaithilya	1.000	0.000	Infinite	<0.001 (S)
Gatrasada	1.625	0.125	5.150	<0.001 (S)
Snigdhagatrata	1.286	0.571	2.611	0.023 (S)
Alpavyayama	1.333	0.667	0.894	0.422 (NS)

Table 8: Anthropometric measurement effect between Groups.

Criteria	Mean Diff. Group A N=15	Mean Diff. Group B N=15	T	P
Neck	2.633	3.167	-1.121	0.272
Mid arm	2.120	1.967	0.394	0.697
Fore arm	2.133	2.573	-0.939	0.356
Chest	4.447	3.707	0.763	0.452
Abdomen	5.473	3.913	0.984	0.333
Hip	7.067	4.667	2.173	0.038
Mid-thigh	3.553	4.013	-0.444	0.661
Mid-calf	3.160	3.453	-0.473	0.640

Table 9: Skin fold thickness effect in both groups.

Skin Fold Thickness	Mean diff Group A N=15	Mean diff Group B N=15	T	P
Biceps	0.327	0.247	0.744	0.463 (NS)
Triceps	0.280	0.233	0.388	0.701
Scapular	0.440	0.247	0.952	0.349
Abdomen	0.640	0.280	1.796	0.083
Supra iliac	0.360	0.320	0.254	0.801

Table 10: Effect of treatment on weight and BMI between groups.

Criteria	Mean diff Group A N=15	Mean diff Group B N=15	T	P
Weight	5.567	5.600	-0.0504	0.960 (NS)
BMI	2.390	2.224	0.401	0.691 (NS)

DISCUSSION

In this study, total 40 patients were screened, among them 35 patients were having classical signs and symptoms of *Sthaulya*, hence registered for the study. Remaining 5 patients were excluded as they were not fulfilling the inclusion criteria. Registered patients were randomly divided in to two groups by simple random method for further evaluation of *Motha Choorna & Nagarmotha Choorna* in the management of *Sthaulya*. Total 30 patients could complete the treatment while 2

patients dropped out in group A & 3 patient from group B Patients dropped out due to their personal reason.

In the present section, the observations obtained from the demographic data of the 30 registered patients along with the results of the 30 treated patients are discussed. For evaluation of the effect of both the drugs, Clinical features of Sthaulya were used in the present clinical work as subjective criteria. Body weight, BMI, skin fold thickness & body girth measurements made in the objective criteria for the work.

All the subjects were advised to avoid excess usage of oily substances in routine diet. Patients were also advised to avoid *Divasvapna* and were advised to follow regular exercise. As far as *Ayurvedic* science is considered strict following of *Pathya* is equally important along with the medicine intake, especially in cases of *Sthaulya (Obesity)* where lifestyle plays a major role. In order to avoid bias in this regard, patients in both groups were directed to follow same *Pathya* and to avoid same *Apathya.*

Majority of the patients i.e. 16.66% were having body weight of the range 61-70 kg, 20% having 71-80kg, 30% 81-90 kg & 91-100 kg and 3.33% above 100 kg respectively. Usually in Sthaulya increased weight is commonly found. Majority of the patients i.e. 40% were having B.M.I. of the range >33->35 and >30-33, 16.66% were having B.M.I. of the range >25-28, 3.33% having B.M.I of the range >28-30. The B.M.I of 25 to 30 kg /m^2 is considered as obese and above 40 kg /m^2, BMI considered as severe or morbid obese. As the B.M.I increases patients fall into higher grade of obesity. In this study most of the patients suffered 2^{nd} grade (BMI 30-40) Obesity.

Moderate improved in Group A was 30%, Mild improvement in Group A was 20% while in Group B 30%. Moderate improvement observed, mild improvement observed in 20%. Group A and Group B Cured is unchanged result. In Marked improvement unchanged result in Group A and 3.33% change in Group B.

CONCLUSION

Comparison of subjective evaluation between two groups showed that there was significant improvement in symptoms of group B as compared to group A. All the subjects showed improvement in *Angagauravta*, Ayatoapchya, Atipipasa, Gatrasad, Atiksudha and Nindra in group B as verses group A which showed only 87.35%, 65.37%, 71.99%, 92.30%, 50 and 84.61% respectively. This difference may be due to Nagarmotha. In Some Motha has shown more significant result like ChalaSphikUdarStana, Ayatoupachaya, Snigdhangata seen more significant than Nagarmotha. Comparison of BMI between two groups showed that reduction in BMI of group A is significant at 7.60% whereas that of group B is at 7.01%. The reduction in BMI is not observed markly difference in both groups. Though Group A shows significant change than Group B. The study concluded that comparative there is not much difference found in both verities but individually in group *Nagarmotha (Cyperus Scariousus* Linn.) found slightly better difference than *Motha (Cyperus Rotundus* Linn.).

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