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A comparative clinical study of two source plant *Motha* (*Cyprus Rotundus* Linn.) and *Nagarmotha* (*Cyprus Scariousus*) in *Sthaulya* (Obeisty)

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A B S T R A C T

Herbal product market is increasing day by day throughout the world and various pharmaceutical companies conducting extensive research on plant material for their potential medicinal value. *Motha* (*Cyperus rotundus),* a is found in all tropical, subtropical and temperate region of the world, in India its commonly known as *Motha* and its in cypereacea and *Nagarmotha (Cyperus Scariosus)* is pestiferous perennial, delicate slender sedge found wildly in various parts of the country, especially in damp or marshy areas and collected wildly for extraction of its essential oil using steam distillation. The present review article provide an overview on comparative clinical study done on *Sthaulya* (Obesity).

Key words: Sthaulya, Obesity, *Mustha*, *Motha*, *Cyperus rotundus, Nagarmotha, Cyprus Scariousus.*

INTRODUCTION

Motha (*Cyperus rotundus*) commonly known as *Motha* is found throughout India. It belongs to the family Cyperacea. The genus name *Cyperus* is derived from *Cypeiros,* which was the ancient Greek name for the genus, *rotundus* is Latin word for round and refers to the tuber.[1] The family comprises about 104 genera and more than 5000 species world‑wide, although number vary greatly due to differing taxonomic concepts of individual researchers. The largest genus is *Carex* with about 2000 species world‑wide, followed by *Cyperus* with about 550 species.[2] It is a

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pestiferous perennial weed with dark green glabrous culms, arising from underground tubers. It is actually a field weed known in all the Southern States as nut grass. The plant produces rhizomes, tubers, basal bulbs and fibrous roots below ground and rosettes of leaves, scapes and umbels above ground.[3]

Botonical classification of *Cyprus Rotundus* Linn.

- Kingdom   : Plantae
- Subkingdom   : Tracheobionta
- Super division : Spermatophyta
- Division   : Magnoliophyta
- Class   : Liliopsida
- Subclass   : Commelinidae
- Order   : Poales (Cyperales)
- Family   : Cyperacae
- Genus   : *Cyperus*
- Species   : *Rotundus*[4]

Vernacular Names

Arabic : Soad, Soadekufi, Bangali : Nagarmotha, Burma : Vomonniu, Hindi : Nagarmotha, Malaya:

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Mushkezamin, Gujarati: *Nagaramothaya*, English: Nut grass, Sanskrit : Chakranksha, Charukesara, Urdu: Saad kufi.[3],[5]

Distribution

Nagarmotha (*C. rotundus*) is a cosmopolitan weed found in all tropical, subtropical and temperate regions of the world. In India, it is common in open, disturbed habitats to an elevation of about 1800 m.

Nagarmotha

Cyperaceae family includes approximately 3000 species out of which about 220 species are identified as weeds. The genus *Cyperus* comprises more than fifty-two species that grow in damp or marshy places in India. The nut sedges originate from tropical and subtropical areas. The plant produces rhizomes, tubers, basal bulbs and fibrous roots below ground and rosettes of leaves, escapes and umbels above ground. *Cyperus scariosus* Linn. also known as Nut grass, *Nagarmotha* and *Nagarmustak* is a delicate, slender sedge of this genus. The rhizomes of *Nagarmotha* occur 3-4 cm deep in soil and dug out from the soil. Rhizomes and stolons have a number of wiry roots. Stolons are 10-20 cm long with a number of rhizomes crowded together. The rhizomes are bluntly conical and vary in size and thickness. They are initially white and fleshy with scaly leaves and then become fibrous, wiry and very dark brown with age.

C. scariosus is an angiosperm belonging to family Cyperaceae, wildly present in and around rivers, waterfall and other damp places. The plant requires sun and moist conditions, though it grows in sandy soil (one of the old Chinese names for it was shacao, meaning sand weed), as well as in loamy moist fields and particularly in Pacific Islands (where its leaves are used in weaving) as well as along coastal regions. *Cyperus* grows rapidly and fills the soil with its tangle of roots and rhizomes. *C. scariosus* is basically perennial, its height is approximately 45-75cm. Leaves are sharp, pointed and 0.3-0.85cm wide: flowers are 5-17.5cm long. In *C. scariosus,* flowering is seen in July and fruits are formed in December. Only a few scattered reports are available in the literature on germination and nursery practices of *C. scariosus.*

Distribution

Cyperus scariosus is widely distributed in India, especially in Chhattisgarh, Bihar, Orissa, West Bengal and Uttar Pradesh. *C. scariosus* grows in damp places in U.P., Bengal and southern part of India. It is also present in Chattarpur and Katni districts in Madhya Pradesh and adjoining areas of U.P particularly Jhansi and Banda, as reported by Jain (1991).

Collection and storage

The Rhizomes of C*yperus rotundus* and *Cyperus Scariosus* are collected, washed and dried in shade. When the Rhizomes dry completely, they are stored in containers. It can also be stored in powdered form. The dry Rhizomes crushed and ground in grinders and the powder is stored in containers.

Clinical Study

Research in the field of medicine has inherent dynamism, as it involves perpetual interaction with the living beings. Clinical research is based on observations made with acuity on the part of erudite physicians. Although *Acharyas* have documented their keen observations as objectively as possible but the ultimate aim of Ayurvedic research in the present scenario is correct interpretation of its accretions.

Present study is planned to evaluate clinical efficacy of both the varieties of plant *Motha* and Nagarmotha on management of Sthaulya (Obesity), clinically, in order to find out better option. In present study, selection and division of volunteers was done by random sampling method.

OBJECTIVES

To evaluate clinical efficacy of *Motha* and *Nagarmotha* on management of *Sthaulya* (Obesity).

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 Proforma based on *Ayurvedic* guidelines was filled. Informed consent was taken from the patient before including them in the trial.

Plan Of Study

Inclusion Criteria

1. 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, Kshudra Shwasa, Nidradhikya etc.* were selected, irrespective of sex, religion etc. from the O.P.D. and I.P.D. of Parul Ayurved Hospital Vadodara.

2. 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.

3. B.M.I. – Patients with BMI >25 Kg/m^2 were included in study.

Exclusion Criteria

1. Age of patient less than 18 years and more than 60 years.

2. Patients having major illness like cardiac diseases, diabetes mellitus etc. and also the involvement of other systemic disorders.

3. Patients having *Sthaulya* due to pregnancy, drug induced, Cushing's syndrome, hypothyroidism, other hormonal disorder and related to any disease.

Grouping

Patients were randomly divided into below mentioned 2 groups,

- **Group A:** *Motha Rhizome Choorna*

- **Group B:** *Nagarmotha Rhizome Choorna*

Patients of both the groups was suggested similar type of *Vyayama* and *Pathya-Apathya*.

Dose and Posology

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

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.

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 into two groups by simple random method for further evaluation of *Motha Choorna* and *Nagarmotha Choorna* in the management of *Sthaulya*. Total 30 patients could complete the treatment while 2 patient dropped out in Group A and 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

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both the drugs, Clinical features of *Sthaulya* were used in the present clinical work as subjective criteria. Body weight, BMI, made in the objective criteria for the work.

The age group for selection was fixed as 18 years to 60 years because though *Sthaulya* (Obesity) can be occurred at any age, but usually it gets evident or shows the different clinical complications as the age advances. Patients having classical signs and symptoms of *Sthaulya* i.e. *Shwasa, Nidradhikya etc.* and patients with BMI > 25 Kg/m^2 were included in the study. Patients having major illness like cardiac diseases, diabetes mellitus etc. and having *Sthaulya* due to pregnancy, drug induced, Cushing's syndrome, hypothyroidism, other hormonal disorder were excluded because *Sthulya* with these reasons have multiple pathology and in such conditions the effect of medicine cannot be ruled out due to different causative factors and *Samprapti*.

Table 1: Effect of treatment on chief complaints of Sthaulya (Obesity) in Group A.

Chief Complaint	N	BT	AT	Diff	SD	SEM	% relief	t	p
Bharavriddhi	15	2.1333	1.7333	0.400	0.5071	0.1309	18.75	3.5	0.009 S
ChalaUdarsphikstana	6	1.3333	0.6667	0.6667	0.5164	0.2108	49.96	2.1213	0.025 S
Angagaurava	5	1.8	0.4	1.286	0.5477	0.2449	77.77	8.5732	<0.001 S
Ayathopachaya	15	1.8	0.6667	1.133	0.6399	0.1652	62.96	6.859	<0.001 S
Daurgandhya	6	1.1667	0.3333	0.833	0.4082	0.1667	71.43	5	0.004 S

Atikshudha	12	1.8333	0.583	1.250	0.7558	0.2176	68.18	5.745	<0.001 S
Atipipasa	12	1.8333	0.583	1.250	0.7558	0.2176	68.18	5.745	<0.001 S
Swedadhikya	13	1.6154	0.8462	0.769	0.5991	0.1662	47.61	4.629	<0.001 S
Nidradhikya	5	1.4	0	1.400	0.5477	0.2449	0	5.715	0.0005 S
Gatrasada	8	1.375	0	1.375	0.5175	0.183	0	7.514	<0.001 HS
Snigdhagatrata	11	1.2727	0.4545	0.818	0.4045	0.122	64.28	6.708	<0.001 S

After the treatment in Group A maximum percentage improvement was noticed in *Angagaurava* 77.7 and Daurgandhya 71.43, while 68.18% improvement was noticed in *Atikshudha* and *Atipipasa* each, *Snigdhagatrata* 64.28% improvement was noticed. 62.96% noticed in *Ayatopachaya.*The improvement was observed in other symptoms also and the results were highly significant except *Nidradhikya* and *Gatrasada* where there was no significant result found.

Table 2: Effect of treatment on chief complaints of Medoroga in Group B.

Chief Complaint	N	BT	AT	Diff	SD	SEM	% relief	t	p
Bharavriddhi	15	2.1333	1.6667	0.4667	0.5164	0.1333	21.86	3.500	0.004 S
ChalaUdarsphikstana	7	1.1429	0.7143	0.4249	0.5345	0.202	37.50	2.1121	0.078 NS

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Symptom	n	BT	AT	Diff	SD	SEM	% relief	t	p
Angagaurava	10	1.7	0.3	1.400	0.5164	0.1633	82.35	8.573	<0.001 HS
Ayathopachaya	14	1.8571	0.6429	1.214	0.6993	0.1869	65.37	6.497	<0.001
Daurgandhya	4	1.5	0.75	0.750	0.5	0.25	50	3.000	0.058
Atikshudha	10	1.5	0.6	0.900	0.5676	0.1795	60	5.014	<0.001
Atipipasa	14	1.7857	0.5	1.286	0.6112	0.1634	71.99	7.870	<0.001
Swedadhikya	10	1.7	0.9	0.800	0.6325	0.2	47.05	4.000	0.003
Nidradhikya	9	1.4444	0.2222	1.2222	0.441	0.147	84.61	8.315	<0.001
Angashaithilya	4	1	0	1.000	0	0	0	infinite	<0.001
Gatrasada	8	1.625	0.125	1.500	0.7559	0.2673	92.30	5.612	<0.001
Snigdhagatrata	7	1.2857	0.5714	0.714	0.48	0.1844	55.55	3.873	0.008
Alpavyayama	3	1.3333	0.6667	0.667	0.5774	0.3333	49.98	2.000	0.184

After the treatment in Group B maximum percentage improvement was noticed in *Gatrasad* i.e. 92.30%, *Nidradhikya 84.61%, Angagaurav 82.3%*.

The improvement was observed in other symptoms also and the results were highly significant except *Ayatupachaya, Daurg*and*hya, Atikshudha, Snigdhagatrata* where there was significant result found. *Angasaithilya, Alpavyayama* and *Chalasudarsphikstana* there was insignificant result found.

Table 3: Effect of treatment on weight and BMI In Group A

Criteria	BT	AT	Diff	% of relief	SD	SEM	t	p
Weight	85.700	80.133	5.567	6.49	1.266	0.327	17.032	<0.001
BMI	31.407	29.017	2.390	7.60	1.295	0.334	7.148	<0.001

The table portrays that reduction in weight was 6.49% while BMI was reduced by 7.60%. All results were highly significant (<0.001)

Table 4: Effect of treatment on weight and BMI in Group B.

Criteria	BT	AT	Diff	% of relief	SD	SEM	t	p
Weight	82.867	77.267	5.600	6.75	2.230	0.576	9.727	<0.001
BMI	31.713	29.489	2.224	7.01	1.02	0.22	9.137	<0.001

The table portrays that reduction in weight was 6.75% while BMI was reduced by 7.01%. All results were highly significant (<0.001)

Table 5: Comparison 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

The effect of *Motha Choorna* and *Nagarmotha Choorna* on Weight, BMI has been summarized in the above table in which weight and BMI shows Moderate difference between two groups.

**Table 6: Distribution of patients according to Result.**

Result	No. of Patients			
	Group A	**%**	**Group B**	**%**
Cured	0	0	0	0
Mar. Improved	0	0	1	3.33
Mod. Improved	9	30	9	30
Mild Improved	6	20	5	16.66
Un-Changed	0	0	0	0

DISCUSSION

Obesity is responsible for a number of diseases like cardiovascular events, hypertension, diabetes mellitus etc. It is one of the leading causes of death in the world. It has a high morbidity and mortality rate. A number of research papers indicate its role in causing insulin resistance and leptin resistance. Obesity causes increased oxidative stress which in turn causes above morbidities.

Clinical study has been carried out to validate the concept practically. In the clinical study patients of *Sthaulya* were selected as per inclusion criteria and were randomly divided into two groups. *Motha* rhizome *Choorna* was provided as drug in group A with *Pathya - Apathya* and in group B *Nagarmotha* Rhizome C*hoorna* was given with *Pathya - Apathya*. Total 30 patients (15 in each group) completed the treatment. All the available data as mentioned in the proforma was compiled with suitable scoring pattern and assessment criteria. The effect of therapy on cardinal symptoms as well as on weight, BMI, etc. objective parameters were assessed.

Literary review strongly evidences the *Lekhaneeya* action of the drug *Motha* and *Nagarmotha* based on its placement in the respective *Gana*. Utility in the treatment of *Santarpanottha Vyadhis* is supported by *Tikta*, *Kashaya*, *Katu Rasa*, *Laghu - Ruksha Guna*, *Lekhan Karma* and *Katu Vipaka* of drug viz. *Motha* and *Nagarmotha.*

Overall effect of Treatment
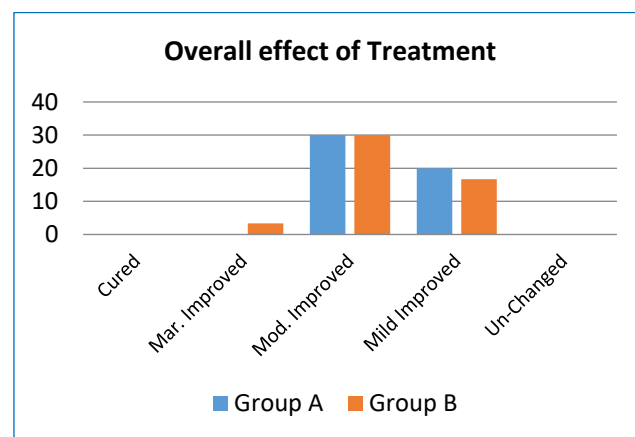
Ayurvedic drugs also possess anti-oxidant properties *Motha* and Nagarmotha is one such drug, It is a rich source of polyphenols and ascorbic acid which show anti-oxidant properties. Ãchãrya Caraka has mentioned *Musta* in lekhaniya gana in Charaka Sutrasthana chapter 4 "shadvirechanashatashriya ". These drugs are responsible for scraping off and removing fats out of the body.

Musta being tikta, katu rasatmak, laghu and ruksha in guna ;and katu vipaki burns and metabolises fats, improves process of fat metabolism, chelates the already present fat and removes it out of the body.

Subjective criteria

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.

Objective criteria

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.

Similarly for Waist to Hip ratio the significant reduction in group B as against only group A can be attributed to *Nagarmotha.*

Due to *Lekhana, Medoghna, Kapha-Vatahara, Laghu, Ushna* and *Ruksha Guna, Katu, Tikta, Kashaya Rasa* and *Katu Vipaka* properties of the drug *Motha* and *Nagarmotha Choorna.* By its use with *Pathya-Apathya,* accumulated *Apachita Meda Dhatu* was decreased and thus *Motha* and *Nagarmotha* was found beneficial in the present study.

CONCLUSION

The study conclude that *Motha* (*Cyperus Rotundus* Linn.) and *Nagarmotha* (Cyperus Scariousus) is effective in reducing the classical Sign and symptoms of *Sthaulya* in subjective criteria as well as a reduction in weight as well as BMI in objective criteria.

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