A comparative clinical study of two source plant Motha (Cyprus Rotundus Linn.) and Nagarmotha (Cyprus Scariosus) in Sthaulya (Obesity)

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ABSTRACT

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 cyperaceae 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 Scariosus.

INTRODUCTION

Motha (Cyperus rotundus) commonly known as Motha is found throughout India. It belongs to the family Cyperaceae. 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 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

Botanical classification of Cyprus Rotundus Linn.

- Kingdom : Plantae
- Subkingdom : Tracheobionta
- Super division : Spermatophyta
- Division : Magnoliophyta
- Class : Liliopsida
- Subclass : Commelinidae
- Order : Poales (Cyperales)
- Family : Cyperaceae
- Genus : Cyperus
- Species : Rotundus4

Vernacular Names

Arabic : Soad, Soadekufi, Bangali : Nagarmotha, Burma : Vomonniu, Hindi : Nagarmotha, Malaya:
Mushkezamin, Gujarati: Nagaramothaya, English: Nutgrass, Sanskrit: Chakranksha, Charukesara, Urdu: Saad kufi.[9][10]

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 Chattapur 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 Cyperus 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, Pipasadhiyka, 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/m² 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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dosage form</td>
<td>Choorna of Rhizome</td>
<td>Choorna of Rhizome</td>
</tr>
<tr>
<td>2.</td>
<td>Form</td>
<td>Choorna</td>
<td>Choorna</td>
</tr>
<tr>
<td>3.</td>
<td>Dose</td>
<td>6gms/day</td>
<td>6gms/day</td>
</tr>
<tr>
<td>4.</td>
<td>Route of administration</td>
<td>Oral</td>
<td>Oral</td>
</tr>
<tr>
<td>5.</td>
<td>Time</td>
<td>Empty Stomach</td>
<td>Empty Stomach</td>
</tr>
<tr>
<td>6.</td>
<td>Duration</td>
<td>60 days</td>
<td>60 Days</td>
</tr>
</tbody>
</table>

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
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. Shwasā, Nidradhiyā etc. and patients with BMI > 25 Kg/m² 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 Sthaulya 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.**

<table>
<thead>
<tr>
<th>Chief Complaint</th>
<th>N</th>
<th>BT</th>
<th>AT</th>
<th>Dif</th>
<th>SD</th>
<th>SE</th>
<th>M</th>
<th>% rel</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bharavridhi</td>
<td>1</td>
<td>2.1</td>
<td>33</td>
<td>1.7</td>
<td>33</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
<td>18</td>
<td>.7</td>
</tr>
<tr>
<td>ChalaUdar sphikstana</td>
<td>6</td>
<td>1.3</td>
<td>33</td>
<td>0.6</td>
<td>66</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
<td>49</td>
<td>.9</td>
</tr>
<tr>
<td>Angagaurava</td>
<td>5</td>
<td>1.8</td>
<td>33</td>
<td>0.4</td>
<td>28</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
<td>77</td>
<td>.7</td>
</tr>
<tr>
<td>Ayathopacaya</td>
<td>1</td>
<td>1.8</td>
<td>66</td>
<td>0.3</td>
<td>66</td>
<td>0.6</td>
<td>0</td>
<td>0.6</td>
<td>62</td>
<td>.9</td>
</tr>
<tr>
<td>Daurgandhya</td>
<td>6</td>
<td>1.1</td>
<td>33</td>
<td>0.3</td>
<td>83</td>
<td>0.4</td>
<td>0</td>
<td>0.4</td>
<td>71</td>
<td>.4</td>
</tr>
</tbody>
</table>

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 Nidradhiyā and Gatrasada where there was no significant result found.

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

<table>
<thead>
<tr>
<th>Chief Complaint</th>
<th>N</th>
<th>BT</th>
<th>AT</th>
<th>Dif</th>
<th>SD</th>
<th>SE</th>
<th>M</th>
<th>% rel</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bharavridhi</td>
<td>1</td>
<td>2.1</td>
<td>33</td>
<td>1.6</td>
<td>66</td>
<td>0.5</td>
<td>0</td>
<td>0.6</td>
<td>68</td>
<td>.1</td>
</tr>
<tr>
<td>ChalaUdar sphikstana</td>
<td>7</td>
<td>1.1</td>
<td>42</td>
<td>0.7</td>
<td>42</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
<td>37</td>
<td>.5</td>
</tr>
</tbody>
</table>

After the treatment in Group B 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 Nidradhiyā and Gatrasada where there was no significant result found.
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, Daurgandhya, Atikshudha, Snigdhagatrata where there was significant result found. Angasaithilya, Alpavyayama and Chalasudarshphikstan only was insignificant result found.

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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>BT</th>
<th>AT</th>
<th>Diff</th>
<th>% of relief</th>
<th>SD</th>
<th>SE</th>
<th>M</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>85.7</td>
<td>80.1</td>
<td>-5.6</td>
<td>7.6%</td>
<td>4.3</td>
<td>1.5</td>
<td>2.9</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI</td>
<td>31.4</td>
<td>29.0</td>
<td>-2.4</td>
<td>8.3%</td>
<td>1.2</td>
<td>0.3</td>
<td>0.9</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>BT</th>
<th>AT</th>
<th>Diff</th>
<th>% of relief</th>
<th>SD</th>
<th>SE</th>
<th>M</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>82.8</td>
<td>77.2</td>
<td>-5.6</td>
<td>7.6%</td>
<td>4.3</td>
<td>1.5</td>
<td>2.9</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI</td>
<td>31.7</td>
<td>29.4</td>
<td>-2.3</td>
<td>8.3%</td>
<td>1.2</td>
<td>0.3</td>
<td>0.9</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mean diff Group-A n=15</th>
<th>Mean diff Group-B n=15</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>5.567</td>
<td>5.600</td>
<td>-0.0504</td>
<td>0.960 NS</td>
</tr>
<tr>
<td>BMI</td>
<td>2.390</td>
<td>2.224</td>
<td>0.401</td>
<td>0.691 NS</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Result</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A %</td>
</tr>
<tr>
<td>Cured</td>
<td>0</td>
</tr>
<tr>
<td>Mar. Improved</td>
<td>0</td>
</tr>
<tr>
<td>Mod. Improved</td>
<td>9</td>
</tr>
<tr>
<td>Mild Improved</td>
<td>6</td>
</tr>
<tr>
<td>Un-Changed</td>
<td>0</td>
</tr>
</tbody>
</table>

**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 Choorna 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.

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. Āchārya Caraka has mentioned Musta in lekhaniya gana in Charaka Sutraphana 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, Ayatoapchaya, 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 markedly 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, 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.

REFERENCES


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