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AN EXPERIMENTAL STUDY ON THE BRIMHANA EFFECT OF GURU GUNA IN MADHURA AND KASHAYA RASA DRAVYAS ON ANTHROPOMETRIC PARAMETERS

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ABSTRACT

Need for the study: *Brimhana* is one of the *Shadvidhopakramas* mentioned in *Ayurveda*. *Brimhana* is one which leads to augmentation of the body constituents like *Dosha Dhathu* and *mala*. *Brimhana Upakrama* is used widely in *Ayurveda* as a *Chikitsa* for the management of various diseases. *Brimhana* is mainly attained by *Guru Guna* as per classics. *Madhura Rasa* and *Kashaya Rasa* are said to be *Uttama* and *Madhyama* in *Guru Guna* respectively by our *Acharyas*. *Yashtimadhu* and *Udumbara* are the two drugs extensively used in our classics for various purposes. *Yashtimadhu* is *Madhura* in *Rasa* and has *Guru Gunu* whereas *Udumbara* has *Kashaya Rasa* and *Guru Guna*. To evaluate their *Brimhana* effect and to provide an adequate model to assess the concept of *Brimhana* effect of *Guru Guna* an experimental study was undertaken. **Objectives:** To review the literature on the concept of *Brimhana*. To review the literature on the concept of *Guna* and *Rasa*. To evaluate the *Brimhana* effect of *Guru Guna* in *Madhura* and *Kashaya Rasa Dravyas* on experimental models. **Materials and Methods:** An experimental study on 18 wistar albino rats which were selected randomly and grouped into 3.each group consisting 6 rats – **1.Control Group**, **2. *Yastimadhu* Group, 3.*Udumbara* Group.** Results were analysed using Anova and Dunnet's multiple 't' test**. Results & Conclusion:** Results of the study revealed that the *Guru Guna* of *Madhura Rasa Dravya* has more *Brimhana* effect than the *Guru Guna* of *Kashaya Rasa Dravya*

Keywords: *Shadvidhopakrama, Brimhana, Guru, Madhura,Kashaya, Yashtimadhu, Udumbara.*

INTRODUCTION

The eternal science of life *Ayurveda* has indicated various types of *Chikitsa* for the managemnet of diseases. Amongst them *Shadvidhopakrama mentioned by Acharya Charaka* bears a lot of significance. Knowledge of *Shadvidhopakrama* is essential for every *Ayurvedic* physician. *Shadvidhopakramas* are *Langhana, Brimhana, Snehana, Rukshana, Swedana* and Stambhana[1]. *Shadvidhopakrama* plans to act by balancing the proportion of *Mahabhutas* in the body.

According to *Acharya Sushruta Brimhana is having Prithvi and Ambu Mahabhuta* prdominance[2]. *Brimhana*, one of the *Shadvidhopakrama*, refers to the use of substances and procedures which will substantiate the growth of the body[3]. It results in increase in mass and volume of the body as a whole. *Brimhana* should be followed in the case of *Kshina Doshas, Dhatus and Malas*.

There are more than 41 *Gunas* described in the *Ayurvedic Samhitas*. Out of which twenty *Sharira Gunas* are very much important for the diagnosis, prevention and treatment of the disease. To develop the *Guna* concept & its utility, each & every *Guna* should be studied separately. Because, if a single *Guna is* taken for study then & only then study of that particular *Guna* becomes focussed and gives some guidelines to understand that particular *Guna*. *Brimhana* being one of the *Shadvidhopakrama*, can be achieved mainly by *Guru Guna*. *Hemadri* describes *Guru Guna* as the quality which imparts *Brimhana* to the body[4]. That is the reason *Guru Guna* is taken for the research work.

Any *Dravya* (*Ahara* or *Aushadha*) is one of the main factors for good health. These *Dravyas* are having *Rasa*, *Guna*, etc. Usage of these *Dravyas* in a proper way maintains health and prevents diseases. Among the *Rasa Panchakas, Rasa* is most important in a *Dravya*[5], which on one side indicates the *Bhautika* composition of the drug and on the other side predicts the action of drug on *Dosha*, *Dhatu* and *Mala*. Classics has considered *Rasa* as an important constituent of a *Dravya* which is depicted with various informative aspects regarding its properties, actions, side effect on overdose, sequence in medicine or diet etc[6].

Acharya Charaka has mentioned that *Madhura Rasa* is *Uttama* in *Guru Guna* whereas *Kashaya Rasa* is *Madhyama* and *Lavana*, *Avara*[7]. There is a need for adding more evidence to this concept in accordance with the era which we live and provide an adequate model to assess these concepts. By considering the above factors "An experimental study on the *Brimhana* effect of *Guru Guna* in *Madhura* and *Kashaya Rasa Dravyas"* was planned.

The test drugs taken for the experiment, *Yashtimadu* and *Udumbara* are mentioned in the *Samhitas* having *Madhura Rasa* and *Kashaya Rasa* respectively[8],[9]. Both of them are having *Guru guna*. They were administered to evaluate their *Brimhana* effect and the effect observed was compared to the control group. This study aims to fulfil the needs of both literary and experimental basis with regards to one of the most important *Upakramas* of

Shadvidhopakrama mentioned in *Ayurveda – Brimhana*.

AIM OF THE STUDY:

To evaluate *Brimhana* effect of *GuruGuna* in *Yashtimadhu* and *Udumbara* in animal models.

MATERIALS AND METHOD:

Yashtimadhu Choorna was collected from SDM *Ayurveda* pharmacy, Kuthpady, Udupi and market sample of *Udumbara was* collected.. Sample source for experimental study - Albino rats were taken randomly from SDMCA animal house for the study and grouped into 3, each group consisting of 6 rats, control group, *Yastimadhu* group and *Udumbara* group. Healthy albino rats of either sex weighing about 150 – 200 g were included and weight less than 150 g and more than 200 g, pregnant and diseased rats and rats which were under trial of other experiments were excluded. The duration of the study was for 28 days.

Preparation of the drug:

The required dose of *Yashtimadhu Choorna* and *Udumbara Choorna* were properly triturated with by adding sufficient quantity of water. The drugs were administered daily at 9.00 AM.

Dose fixation of the drug:

The dose of *Yastimadhu Choorna* and *Udumbara Choorna* was calculated by extrapolating the human dose to animals, based on the body surface area ratio by referring the Paget and Barnet's standard table. The dose of both *Choornas* was fixed as 108 mg/100g body weight.

Route of drug administration:

The drugs were administered by oral route with the help of feeding tube.

Experimental Procedure:

Each rat from all 3 groups was kept in separate metabolic cage provided with constant amount of water and food per day. For each rat of control, test 1 and test 2 groups 6 g food per 100 g body weight were provided in the food hopper per day. The drug *Yashtimadhu* and *Udumbara* were administered to the Test 1 and Test 2 groups daily once at 9.00 am.

LIST OF EXPERIMENTS CARRIED OUT TO SUPPORT *BRIMHANA UPAKRAMA*:

1. Anthropometric measurements[10]
2. Swimming endurance test[11]
3. Measurement of basal rectal temperature[12]
4. Locomotor activity[13]
5. Rotarod test[14]
6. Serum cortisol[15]

1. Anthropometric measurements :

On the 7th, 14th, 21st and 28th day of the experiment the weight and anthropometric measurements of each rat from all the groups was noted. The anthropometric measurements were taken manually with the help of a thread and measuring scale. The measurements taken for the study were body length, tail length, abdominal circumference, chest circumference, neck circumference, forelimb circumference, hind limb circumference. The body mass index was calculated using the formula, BMI = Body weight (Kg) / Length (m^2).

2. Swimming endurance test:

After noting initial rectal temperature, rats were kept inside specially arranged containers, which were made up of Plexiglas (2L) with a height 50 cm with holed lids. The water level was maintained up to 40 cm height and temperature of water was maintained between 22-24°C. Rats placed in cylinder were initially highly active, vigorously swimming in circles, trying to climb the wall, diving to the bottom. After 2-3 minutes the activities began to subside and to be interspersed with phases of im immobility or floating with stretching the body posture. After 5-6 minutes the immobility reaches a plateau usually the rats remained floated passively in the water in a slightly hunched but upright position and its nose remained just above the surface of water. After 30 minutes of exposure to stressed condition the rats were taken out individually and rectal temperature was immediately noted. The drop in temperature was noted down. The blood samples were collected from retro orbital puncture under light ether anaesthesia. The blood samples were sent for biochemical analysis. The serum cortisol was assessed.

3. Test for muscle tone and balance by using Rotating Rod.

In this method described by Janssen (1960a), the albino rat of either sex was used. The rats of all three groups were placed on a horizontal rotating iron rod one after other having a diameter of 32 mm and rotating at the rate of 15 revolutions per minute. The duration of the time that animals remained on the rod was noted. The time of fall was noted.

4. Locomotor activity test using Actimeter:

Effect of test drug on spontaneous activity was studied by using a latest model activity cage which measures both horizontal and vertical movements of the animal. Four groups of mice were taken as in the earlier experiments. One hour after the administration of the test drug, each animal was gently placed in activity meter (Orchid Instruments, India) and observed for a period of 5 minutes. Number of horizontal movements, number of vertical movements and total number of activity were noted down**.**

5. Procedure for evaluation of biochemical parameter:

Auto cell counter apparatus:

The instrument used for the estimation of the haematological parameters was the auto cell counter. 0.08 ml of blood was collected in a tube containing 0.02 ml EDTA solution. The blood was fed to the auto cell counter, and the instrument was automatically taken the requisite quantity of blood to determine different parameters showed the result. The results of different parameters were recorded.

Serum Cortisol:

The main biological effects of Cortisol are: promotion of gluconeogenesis, deposition of liver glucogen, increase in blood glucose concentration when the

carbohydrate utilization is reduced, effect of fat metabolism and anti-inflammatory action.

Statistical analysis:

All the values were expressed as MEAN ±SEM (Standard error of mean). The data were analysed by ANOVA with Dunnet's multiple't' test post doc. A level of $P < 0.05$ was considered as statistically significant. Level of significance was noted and interpreted accordingly

OBSERVATION & RESULT

Anthropometric parameters:

Observations after the study showed that there was *Brimahana* effect in both the groups (*Yashtimadhu* and *Udumbara*). Statistically *Yashtimadhu* showed more significant results compared to *Udumbara* in parameters of body weight, body mass index and chest circumference. Results of the study revealed that the *Guru Guna* of *Madhura Rasa Dravya* has more *Brimhana* effect than the *Guru Guna* of *Kashaya Rasa Dravya*.

It was observed that there was statistically very significant increase in body weight observed on 1st, 3rd and 4th week of the experiment in comparison to the base line values recorded on first day. The body weight record for 2nd week showed increase in the weight than initial values and was statistically significant. (Table 1).

It was observed that there was statistically very significant gain in body weight of rats administered with *Udumbara Choorna* when body weight was recorded on 3rd and 4th week of the experiment when compared with initial base line body weight. The weight gain was 11.18% and 10.63% on 3rd and 4th week respectively which was higher in comparison to the body weight gain observed in normal diet control group rats in which the body weight gain by 4th week was found to be 4.01% (Table 2).

Body weight records for 1st, 2nd, 3rd and 4th week showed that in both *Yashtimadhu* and *Udumbara Choorna* treated groups the weight gain rate was not much higher and statistically non - significant in comparison to normal diet given group.

It was observed that there was a statistically significant increase in chest circumference when measured on 3rd week and statistically very significant on 4th week by its comparison with the base line values in *Yashtimadhu* administered group. The apparent increase observed on 1st and 2nd week were found to be statistically non-significant (Table 3).

It was observed that there was a statistically significant increase in chest circumference for the data recorded on 4th week of the experiment and its comparison to the base line values in *Udumbara* administered group. The apparent increase observed on 2nd and 3rd week of observation was found to be statistically non-significant. Statistically non significant decrease was observed on 1st week (Table 4).

Comparison between the groups showed the 4th week readings of *Yashtimadhu* treated group had significant increase in chest circumference in comparison to the control group. Though an apparent increase was observed in chest circumference measured on 4th week in

Udumbara treated group it was found to be statistically non- significant.

Comparative difference among different groups with respect to body mass Index recorded on different days showed that the BMI was found to be increased in *Yashtimadhu* and *Udumbara* administered groups on 1st week in comparison to the base line values which was not significant. Apparent increase was observed in *Yashtimadhu* and *Udumbara* administered group in comparison to control group on 2nd week but it was again not quite significant. The 3rd week recording shows increase in *Yashtimadhu* group which was statistically significant. In *Yashtimadhu* treated group a very high increase was observed on 4th week and increase was observed in *Udumbara* group too and it was very significant in comparison to the control group values (Table 5).

It was observed that there was a statistically significant increase in the body mass index in *Yashtimadhu* treated group when the values recorded on 1st and 2nd week were compared with the base line values. There was statistically very significant increase in the body mass index on the 4th week compared to base line values. The percentage increase ranged from 12 to 22.12%.

The BMI recordings of 1st, 2nd 3rd and 4th week showed no apparent difference in comparison to base line value and hence it was statistically non-significant.

Measurement of basal rectal temperature:

Significant hypothermia was seen in both the groups compared to the control group. The magnitudes of both the groups were almost similar.

Swimming endurance test:

The decrease observed in latency of immobility seen in *Yashtimadhu* treated group was not significant compared to the control group. The decrease latency of immobility of *Udumbara* treated group was significant compared to the control group.

Rotarod test:

The time of fall showed no much difference in the 3 groups. There was no significant difference in the time of fall of the rats subjected to *Yashtimadhu* and *Udumbara* group**.**

Locomotor activity:

The vertical movements were found to be increased in *Yashtimadhu* and *Udumbara* groups. However, the increase observed in *Udumbara* given group was found to be statistically very significant. The x + y axis movements in rats was statistically significant in case of *Udumbara* administered group.

Serum cortisol

There was no significant change observed in the serum cortisol test for both the groups.

DISCUSSION

Mamsa Dhathu is responsible for *Shareera Pushti*. Thus a gain in weight suggests the augmentation of *Mamsa Dhatu*. As both *Yashtimadhu* and *Udumbara* have *Prithvi Mahabhuta* in them (*Prithvi* & *Jala* in *Madhura Rasatmaka Yashtimadhu* and

Prithvi & *Vayu* in *Kashaya Rasa* of *Udumbara*), and *Mamsa Dhatu* which is also *Prithvi Mahabhuta* dominant, as per the concept of *Samanya-Vishesha*, both groups have gained the weight. The results observed within the group were statistically more significant compared to between the groups. This may be because of the smaller dose taken for the experiment.

The increase observed in chest circumference is in conformity with the concept that firm and bulky chest is said to be the feature *of Mamsa Sara Purusha* because of the excellence in *Mamsa Dhatu*. Thus the increase in chest circumference signifies the increase in *Mamsa Dhatu* in this group. Thus upholding the concept *"Brimhana"* i.e. *Mamsa Dhatu* gets nourished by the administration of *Madhura* and *Kashaya* rasa *Dravya* having *Guru Guna*. Here too the results showed more significant increase within the groups than between the groups. It again may be because of the smaller dose taken.

The results of body mass index showed that the increase was more in *Yashtimadhu* compared to *Udumbara*. This shows that *Yashtimadhu* having *Madhura Rasa* and *Guru Guna* and *Udumbara* having *Kashaya Rasa* and *Guru Guna* has the *Brimhana* effect. But the effect is more pronounced in the former (*Yashtimadhu)* and it can also be observed that *Yashtimadhu* having *Madhura Rasa* is *Uttama* in *Guru Guna* whereas *Udumbara* is *Madhyama*. *Yashtimadhu* is having *Snigdha Guna* along with *Guru* whereas *Udumbara* is having *Rooksha Guna*. This *Rooksha Guna* might have lead to only slight increase in body mass index when compared to significant increase by *Yashtimadhu.*

The significant hypothermia seen in both the groups may have been due to the smaller dosage taken for the study.

In *Udumbara* treated group, statistically significant decrease in the number of immobility was observed in comparison to the control group. The inactive behaviour may have two components-one psychological and another physical which may be similar to *Satvabala* and *Dehabala*. Immobility can be considered to be an index of *Satvabala*. The significant decrease observed in this parameter when considered clearly shows that the experimental diet increases mental tolerability and strength. It is intriguing that contrary to the result obtained with other *Mamsa Dhatu* related parameters the effect in this parameter was higher in *Udumbara* group in comparison to *Yashtimadhu* group. It is likely that the latency decrease and decrease in immobility episodes may have Satvabala component which is better expressed with *Kashaya rasa*. This needs further elucidation.

In evaluation of locomotor activity using actimeter the observed effect can be explained in *Udumbara* as the effect of *Brimhana* due to *Guru Guna*, increase of *Dehabala* is one among the *Lakshana* of *Brimhana*. The non significant changes observed in both Rotarod and Serum Cortisol test may be due to the smaller dosage of the drugs. Further study can be

conducted based on larger dose comparatively.

PROBABLE MODE OF ACTION OF *YASHTIMADHU CHOORNA*: *Yashtimadhu* is having a property of *Madhura Rasa, Guru Guna* and *Madhura Vipaka* which is *Vata Shamaka*. *Srotoshodhaka* property of *Yashtimadhu* helps in clearance of channels and improves the circulation of *Dhatus* and indirectly helps in nourishment of *Dhatus*. It is responsible for *Uttarottara Dhatu Poshana*. On the other hand *Guru, Sheeta, Snigdha* and *Mridu Gunas* are directly responsible for *Brimhana* effect in body. *Rasayana* property improves general health and immunity. *Jivaniya* property maintains equilibrium of *Dosha*, *Dhatu* and *Malas*.

PROBABLE MODE OF ACTION OF *UDUMBARA CHOORNA*: *Udumbara* is having *Kashaya Rasa* and *Guru Guna*. Due to *Karshana* property again it can be considered as *Sroto shodhaka*. It has *Prithvi* and *Vayu Mahabhoota*. *Guru Guna* is mainly attributed to *Prithvi Mahabhootha* and thus it may lead to the nourishment or *Brimhana*. *Yashtimadhu* is *Uttama* in *Brimhana* compared to *Udumbara* may be because it has *Prithvi* and *Jala Mahabhootha* and both have *Guru Guna* in them. Whereas *Udumbara* has *Prithvi* and *Vayu Mahabhootha* and this might be the reason it is comparatively lesser in giving *Brimhana* effect compared to *Yashtimadhu*.

Yashtimadhu is having *Madhura Rasa, Guru Guna* and *Snigdha Guna.* If *Mahabhuta* configuration is considered, *Madhura Rasa* is due to *Prithvi* and *Jala Mahabhuta.* Both these *Mahabhutas* have *Guru Guna.* So, *Brimhana* effect occurred due to these factors *Udumbara* is having *Kashaya Rasa, Guru* and *Rooksha Gunas. Mahabhutas* dominant here are *Prithvi* and *Vayu. Prithvi* has *Guru Guna* whereas *Vayu* is *Laghu Gunatmaka.* Both *Gunas* are antagonistic in nature.

CONCLUSION

From the experimental study it is seen that *Madhura Rasa* is *Uttama* in *Guru Guna* whereas *Kashaya Rasa* is *Madhyama*. It was seen by the administration of *Yastimadhu* and *Udumbara*. Hence *Madhura Rasa Dravyas* having *Guru Guna* must be the first choice in case of severe depletion of the body constituents. *Kashaya Rasa* can be used where the depletion of tissues is not so severe and when there is unsuitability or hateful disposition towards *Madhura Dravyas*.

Madhura Rasa is *Uttama* due to its *Mahabhootha* constitution i.e *Prithvi* and *Jala (both Prithvi and Jala Mahabhutas have Guru Guna)* whereas *Udumbara* is *Madhyama* because it has *Prithvi* and *Vayu Mahabhootha (Vayu Mahabhuta has Laghu Guna).* So *Yastimadhu* having *Madhura Rasa* may be giving more *Brimhana* effect (due to synergism) compared to *Udumbara* having *Kashaya Rasa* (where *Laghu Guna* of *Vayu* may be hindering the *Brimhana* effect of *Guru Guna* present in *Prithvi*.

Though *Udumbara* has *Kashaya Rasa* and *Katu Vipaka* due to its *Guru Guna* it led to *Brimhana*. By this we can say that *Guna* of a *Drvavya* has utmost importance and it can be seen through its *Karma*.

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TABLES

CHANGE IN BODY WEIGHT WITHIN GROUP:

Table 1: Effect of *Yashtimadhu* on body weight

Yashtimadhu	Body weight (g) Mean ±Sem	% change
Initial	190.6±2.65	-
1st week	201.6±4.47**	5.771↑
2nd week	198.8±4.15*	4.302↑
3rd week	209.2±3.59**	9.758↑
4th week	216.4±4.40**	13.536↑

Data: MEAN±SEM, **P<0.01,*P<0.05

Table 2: Effect of *Udumbara* on body weight

Udumbara	Body weight (g) Mean ±Sem	% change
Initial	180.33±3.98	-
1st week	193.83±7.22*	7.486↑
2nd week	193.5±7.92*	7.303↑
3rd week	200.5±8.80**	11.185↑
4th week	199.5±7.47**	10.630↑

Data: MEAN±SEM, **P < 0.01,*P<0.05

CHANGE IN CHEST CIRCUMFERENCE WITHIN GROUP:

Table 3: Effect of *Yashtimadhu* on chest circumference

Yashtimadhu	Chest circumference Mean ±Sem	% change
Initial	11.36±0.19	-
1st week	11.84±0.17	4.225↑
2nd week	11.84±0.17	4.225↑
3rd week	12.2±0.21*	7.394↑
4th week	12.48±0.32**	9.859↑

Data: MEAN±SEM**,** **P < 0 .01, *P < 0.05

Table 4: Effect of *Udumbara* on chest circumference

Udumbara	Chest circumference Mean ±Sem	% change
Initial	11.4±0.20	-

1st week	11.23±0.20	1.491↓
2nd week	11.65±0.38	2.192↑
3rd week	11.48±0.13	0.701↑
4th week	12.11±0.12*	6.228↑

Data: MEAN±SEM, *P < 0 .05

Table 5: Effect of different treatment on Body Mass Index (BMI)

Group	1st week	2nd week	3rd week	4th week
Control	-4.95±4.66	-3.36±2.84	-9.87±1.63	-12.77±1.96
Yashtimadhu	11.90±3.46	11.39±5.43	7.84±2.64*	21.28±1.28**
Udumbara	11.79±6.53	6.91±5.21	3.95±6.59	12.01±4.42**

Data: MEAN±SEM**,** *P < 0.05, **P < 0.001

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