A CLINICAL EFFICACY OF BRIMHANIYA DASHEMANI IN SUBJECTS OF KARSHYA W.S.R. TO UNDERWEIGHT IN PROMOTING THEIR PHYSICAL HEALTH

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ABSTRACT

Introduction: Growth and development is a physiological process provided, all factors influencing them are healthy. With 102 million men and 101 million women underweight, India leads the world in being home to over 40% of the global underweight population. It continues to have the largest number of underweight people in the world. Acharya Charaka have described atikrasha person under Astouninditiya Purushas and have explained the concept of Brimhana and Brumhana Dravyas which produces Stoolata of body. Hence, the trial was designed to see the efficacy of Brimhana Dashemani in subjects of Karshya in promoting their physical health. Methodology: It was a single arm clinical study where in Brimhana Dashemani Dravyas was evaluated for its effectiveness in subjects of Karshya in promoting Physical health. 30 patients of either gender were selected using inclusion criteria to the trial. The patients were treated with Brimhana Khandha, 12g with 150 ml of milk in divided dose for 90days. The anthropometric measurements like weight, BMI, mid arm circumference, waist circumference and abdominal circumference were noted at 0th, 30th, 60th, 90th and 120th day. Results were analysed for the statistical significance by adopting paired-t-test and multiple ANOVA. Results: Results of the clinical trial revealed that the compound drug used was statistically significant in increasing the weight and thus was also significant in promoting the physical health in subjects of Karshya i.e. underweight. Conclusion: The Brimhana Khandha was found to be effective in increasing weight & thus promoting the Physical health.

Keywords: Brimhana Khandha, Karshya, Physical health, Underweight

INTRODUCTION

Under nutrition is a condition in which there is inadequate consumption, poor absorption or excessive loss of nutrients¹. Their nutritional status is a sensitive indicator of community health and nutrition². Under nutrition impacts in various problems like weight loss, low energy, muscle wasting, increased risk of fractures, increased risk of hospital admission, confusion, anaemia, infections, reduced independence, reduced mobility, low mood³. India continues to have the largest number of underweight
people in the world, a new study published in The Lancet journal has found. With 102 million men & 101 million women underweight, India leads the world in being home to over 40% of the global underweight population. Nonetheless, underweight remains prevalent in the world’s poorest regions, especially in South Asia, it added. The study used data from national and smaller studies representing 19.2 million adults from 186 countries to arrive at its conclusions. It used the standard definitions of underweight (body mass index less than 30kg per sqm). BMI is ratio of weight & height, standardised to various age groups. The 2017 Global Hunger Index (GHI) report ranked India 97th out of 118 countries with a serious hunger situation amongst South Asian nations, it third behind only Afghanistan and Pakistan with a GHI score of 29.0 which is considered as serious situation. India is ranked 67 among the 80 nations having the worst hunger situation which is worse than nations such as North Korea or Sudan. The causes and consequences of under-nutrition in India are economic inequality. Due to the low social status of some population groups their diet often lacks in both quality and quantity. Women who suffer malnutrition are less likely to have healthy babies. Deficiencies in nutrition inflict long-term damage to both individuals and society. Compared with their better-fed peers, nutrition deficient individuals are more likely to have infectious diseases such as pneumonia and tuberculosis, which lead to a higher mortality rate. In addition, nutrition deficient individuals are less productive at work. Low productivity not only gives them low pay that traps them in a vicious circle of under-nutrition, but also brings inefficiency to the society, especially in India where labour is a major input factor for economic production. India’s performance on key malnutrition indicators is poor according to national and international studies. According to UNICEF, India was at the 10th spot among countries with the highest number of underweight and at the 17th spot for the highest number of stunted in the world.

Physical Dimension – a prime means of health: The state of physical health implies, the notion of perfect functioning of the body. Which conceptualizes physical health as a pioneer for wellbeing and from a perfect physical body & functioning itself the other dimensions like mental, social, spiritual health are achieved. Physical health of an individual depends on the nutritional state, where in good nutrition is responsible for achieving the physical dimension of health. One who is deprived will have a bad physical health and will have symptoms of ill-health frequently, frequent use of medications and restricted activity within specified time. Underweight is such a condition where in subject is destitute of physical health due to improper nutritional states. Growth and development is a physiological process provided, all factors influencing them are healthy. Failure to thrive (FTT) or Small for age is resulting when these factors are deficient and in Ayurveda it is addressed as Karshya. Where in conventional medical science have limited answers for impacts of under nutrition. Acharya Charaka have described over lean person under eight despicable persons (Ashta nindita purusha) and have explained the concept of Brimhana (Bruhatwam yat shareerasya Janayet) and Brumhana dravyas which produces stoolata of body. Hence, this is an effort to study the efficacy of Brimhaniya dashemani in subjects of Karshya (underweight/ small to their age or height) in promoting their physical health.

METHODOLOGY
The ethical clearance for the study (approval no : 01SW/2015) was obtained from the Institutional ethical clearance committee- human on march 24, 2016 in JSS Ayurveda Medical College, Mysuru. Study population: 30 Diagnosed cases of Karshya i.e subjects with BMI <18.5 & with classical Lakshanas of Karshya from OPD & IPD of JSS Ayurveda Medical Hospital was taken and intervened with Brimhaniya gana dravya Khanda for 90days. Followed upto 120 days.
Method of collection of data: A detailed proforma was prepared considering the points pertaining to consent, history taking, signs, symptoms and physical examination as mentioned in Ayurveda & contemporary science.

Design of clinical study: It was an open labelled, non–randomized, single group study with Pre and Post-test design.

Diagnostic and inclusion criteria: The subjective & objective parameters of Karshya, whose BMI is less than 18.5, Patients who are small to their age & height (underweight), Patients belonging to either sex between the age group 17-34 years was considered for the study.

Exclusion criteria: Patients suffering from Tuberculosis, Diabetes, Infectious diseases, Endocrine disturbances like Hyperthyroidism and BMI more than 18.5

Intervention: After taking informed consent the subjects was given Chitrakadi Vati (250mg) 1 TID for 3 days before food for Deepana Pachana. Later subjects was advised to take 6g of granules twice daily after food with Luke warm milk (150ml) after proper stirring.

Study duration: Total 120 days including 90 days intervention and follow up for 30 days.

Assessment criteria: Laboratory investigation like Hb%, TC, DC, ESR and Anthropometric measurements like Height (cm), Weight (kg), BMI (kg/m²), mid arm circumference (cm), Abdominal circumference (cm), Waist circumference (cm). The Measurements was taken before treatment and on every visit at 0th, 30th, 60th, 90th days of study period and Follow up on 120th day.

Statistical analysis: Statistical analysis was done using SPSS trial version. Paired t-test was applied to see the difference of pre & post-test parameters. Repeated measure ANOVA test was applied to see difference in the parameters at different intervals. All the tests of significance were interpreted at 5% alpha error.

Table 1: The ingredients of Brimhaniya gana Khanda

<table>
<thead>
<tr>
<th>BRUMHANIYA DASHEMANI DRAVYAS</th>
<th>PRATINIDI DRAVYAS</th>
<th>PART USED and PROPTION OF DRUG USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ksheerini Rajakshavaka</td>
<td>Dugdhika (Euphorbia hirta L.)</td>
<td>Panchanga – 4 PARTS</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>Withania somnifera L.</td>
<td>Moola – 1 PARTS</td>
</tr>
<tr>
<td>Kakoli Ksheerakakoli</td>
<td>Shatavari (Asparagus racemosa Willd)</td>
<td>Moola – 4 PARTS</td>
</tr>
<tr>
<td>Vatyayini Badroudani</td>
<td>Bala (Sida cordifolia)</td>
<td>Moola – 4 PARTS</td>
</tr>
<tr>
<td>Baradwaji</td>
<td>Vanakarpasa (Thespia lampas Dals &amp; Gibs)</td>
<td>Moola – 2 PARTS</td>
</tr>
<tr>
<td>Payasya</td>
<td>Vidarikanda (Pueraria tuberose Dc)</td>
<td>Kanda – 2 PARTS</td>
</tr>
<tr>
<td>Rishyaganda</td>
<td>Vriddadaru (Argyreia speciosa Sweet)</td>
<td>Moola – 2 PARTS</td>
</tr>
</tbody>
</table>

RESULTS

Body weight: The mean value of body weight on 0th day i.e. before treatment was observed to be 42.03 with SD of 6.483. During the study period, the mean value on 30th day was 43.30 with a SD of 6.276, the mean value on 60th day was 44.20 with SD of 6.376 and the mean value on 90th day was 45.40 with SD of 6.420. In the follow up period of 120th day the mean value of body weight was 45.93 with SD of 6.491 respectively. The mean value of body weight increased from 42.03 to 45.40 after treatment during study period.

BMI: The mean value of BMI on 0th day i.e before treatment was observed to be 16.70 with SD of 1.291. During the study period, the mean value on 30th day was 17.30 with a SD of 1.291, the mean value on 60th day was 17.50 with SD of 1.333 and the mean value on 90th day was 17.87 with SD of 1.167. In the follow up period, on 120th day the mean value of BMI was 18.13. The mean value of
BMI increased from 16.70 before treatment to 17.87 after treatment during study period with SD of 1.106 respectively.

**Mid arm circumference:** The mean value of Mid-arm circumference on 0th day i.e before treatment was observed to be 21.73 with SD of 3.129. During the study period, the mean value on 30th day was 22.07 with a SD of 3.118, the mean value on 60th day was 22.60 with SD of 2.884, and the mean value on 90th day was 23.03 with SD of 2.883. During the follow up period, on 120th day the mean value of Mid-arm circumference was 23.53 with SD of 3.014 respectively. The mean value of Mid-arm circumference increased from 21.73 before treatment to 23.03 after treatment during study period.

**Waist circumference:** The mean value of Waist circumference on 0th day i.e. before treatment was observed to be 77.77 with SD of 7.986. During the study period, the mean value on 30th day was 78.10 with a SD of 8.002, the mean value on 60th day was 78.47 with SD of 7.943 and the mean value on 90th day was 79.00 with SD of 7.874. During the follow up period, on 120th day the mean value of waist circumference was 79.50 with SD of 7.763 respectively. The mean value of waist circumference increased from 77.77 before treatment to 79.00 after treatment during the study period.

**Abdominal circumference:** The mean value of abdominal circumference on 0th day i.e before treatment was observed to be 68.57 with SD of 9.058. During the study period, the mean value on 30th day was 68.83 with a SD of 8.998, the mean value on 60th day was 69.17 with SD of 8.902 and the mean value on 90th day was 69.53 with SD of 8.932. During the follow up period, on 120th day the mean value of Abdominal circumference was 70.00 with SD of 8.855 respectively. The mean value of abdominal circumference increased from 68.57 before treatment to 69.53 after treatment during the study period.

**Comparison to see, difference of Weight from 0th day to different time intervals:** Assphericity is not assumed as indicated by p > 0.05 by Mauchly’s test. Sum of the square thus arrived was 298.360 and p value was < 0.001.

**Comparison of BMI at different time intervals i.e. 30th, 60th, 90th and 120th days** was done using repeated measure ANNOVA to know the significant difference among them. As seen by Post hoc test there was significant increase in BMI from 0th day to 120th day which was statistically significant at p value < 0.05.

**Comparison of Mid- arm circumference at different time intervals i.e. 30th, 60th, 90th and 120th days** was done using repeated measure ANNOVA to know the significant difference among them. As seen by Post hoc test there was significant increase in mid-arm circumference from 0th day to 120th day which was statistically significant at p value < 0.05.

**Comparison of Waist circumference at different time intervals i.e 30th, 60th, 90th and 120th days** was done using repeated measure ANNOVA to know the significant difference among them. As seen by Post hoc test there was significant increase in Waist circumference from 0th day to 120th day which was statistically significant at p value < 0.05.

**Comparison of Abdominal circumference at different time intervals i.e. 30th, 60th, 90th and 120th days** was done using repeated measure ANNOVA to know the significant difference among them. As seen by Post hoc test there was significant increase in abdominal circumference from 0th day to 120th day which was statistically significant at p value < 0.05.

**Haematological values:** The study showed considerable increase in Hb% which was statistically significant at p value <0.05 within normal range. Likewise there was considerable increase in WBC, Lymphocytes, Neutrophils, eosinophil’s & monocytes which were all within the normal range. Study also showed participants with increased in ESR levels, with no any considerable illness was reduced at the end of study period and was within normal range.

**Karshyalakshanas: Vyayama Asahata** - Before treatment 21 subjects presented with the lakshana and not observed in 9 subjects. After treatment the
symptoms reduced in 6 subjects. **Atisauhiya Asahata**: Before treatment 6 presented with the lakshana and not observed in 24 subjects. After treatment the symptoms reduced in 5 subjects. **Kshut Asahata**: Before treatment 19 presented with the lakshana and not observed in 11 subjects. After treatment symptoms were reduced in 11 subjects. **Pipasa Asahata**: Before treatment 4 presented with the lakshana and not observed in 26 subjects. After treatment symptoms were reduced in 1 subject. **Aushada Asahata**: Before treatment 11 presented with the lakshana and not observed in 19 subjects. After treatment symptoms were reduced in 3 subjects. **Ati-sheeta Ushna Asahata**: Before treatment 6 presented with the lakshana and not observed in 24 subjects. After treatment symptoms were reduced in 5 subjects. **Sushka udara**: Before treatment 27 presented with the lakshana and not observed in 3 subjects. After treatment symptoms were reduced in 17 subjects. **Sushkagreeva**: Before treatment 27 (90%) presented with the lakshana and not observed in 3 subjects. After treatment symptoms were reduced in 19 subjects. **Sushka spick**: Before treatment all the subjects presented with the lakshana. After treatment were symptoms reduced in 12 subjects. **Damanijala Santata**: Before treatment 14 presented with the lakshana and not observed in 16 subjects. After treatment were symptoms reduced in 6 subjects. **Twaq Asti Shosha**: Before treatment 10 presented with the lakshana and not observed in 20 subjects. After treatment symptoms were reduced in 6 subjects. **Stoolaparva**: Before treatment 2 presented with the lakshana and not observed in 28 subjects. After treatment symptoms were reduced.

**DISCUSSION**

According to a National survey report, list of the states of India ranked in order of people having a Body Mass Index Lower than normal (less than 18.5). Karnataka stands at 13th place with 23.5% male and 29.4% female adults with low BMI. This is quite alarming as the adult population which has to be most productive is affected and are vulnerable with poor physical health. Hence this clinical trial was planned to promote weight & physical health of adult population with low BMI which is addressed in Ayurveda as Karshya with Brimhana-Upakrama.

**Brimhana upakrama and Brimhana khandha**: Ayurveda is one of the traditional systems of medicine that practices holistic principles primarily focused on personalized health. Where in the primary principle of Chikitsa (treatment) focuses on Dhatusamyakriya, which brings the Dhatu in Samyaavastha to support the body. Vatadi Doshas, Rasadi Dooshya, Swedadi mala are called as Dhatu. The Prakruta-Avastha is that where in all these Dhatus are properly formed and functioning. The pathological derangements of these leads to Vikruthi. The vary object of this science aims at maintaining the equilibrium of Dhatus. Though many Upakramas for Karshya has been explained in classics like Brimhana, Snehana and Basti. Prime importance is given to Brimhana Upakarama by all Acharyas. Karshya is the condition where in and agni leads to formation of Alpa-Poshaka Dhatu & resulting in depletion of Uttorotara-Dhatus. Where in the Samavastha of Dhatu is disturbed and the proper functioning of body is hampered. This condition can be rightly correlated to under nutrition where in physical dimension of body is deranged due to improper nutrition leading to small for age condition. The Dravyas which possess Guru, Sheeta, Mrudu, Snigdha, Bahala, Sthoola, Picchhila, Manda, Sthira, and Slakshana Gunas are said to be Brimhana in action. Acharya charaka further explains dravyas with these qualities like – Navaanna, Shali, Masha, Godhuma, Ekshuvikara, Gramyaanupaaudaka mamsa, Dadhi, dugdha, ghruta and rasayana dravyas. Hence in the trial Khandasharkara as Prakshepaka and Ksheera as Anupana both with Brimhana action was used. The Brimhaniya Dashemani was explained in charaka samhita sutra sthana 4th chapter wherein drugs like Ksheerini, Rajakshavaka, Ashwagandha, Kakoli, Ksheerakakoli, Vatayini, Badroudani, Baradwaji, Payasya and Riskyaganda are mentioned. As there
was scarcity or lack of availability and confusion in its exact identity the easily available substitutes were taken for the study which was mentioned by Acharya Chakrapani, so in the present study for the preparation of Brimhana khandha the drugs used are Dugdhiya (Euphorbia hirta L.), Withania somnifera L., Shatavari (Asparagus racemosus Willd), Bala (Sida cordifolia L.), Vanakarpasa (Thespiesia lampas Dals & Gibs), Vidarikanda (Pueraria tuberosa DC) and Vriddadaru (Argyreia speciosa Sweet) displayed in Fig.1.

**Anupana (Fluid vehicle):** Anupana for Aushada dravya have been clearly explained by Acharya Sharangadhara. With this context, Karshya being Vatajarog 3 pala (120ml) Anupana was used with Khanda kalpana. As well Khanda being in choorna form the same dosage was fixed. According to Acharya Sushrutha, in Vata roga – Snigdha and Ushna as Anupana.12

**Probable mode of action:** The compound trial drug – Brimhana Khandha comprises of main as well as pratinidhi dravyas like Dugdika, Ashwagandha, Shatavari, Bala, Vanakarpasa, Vidarikanda and Vriiddhadharu. Karshya being Atarpananajanya-vikara should be emended by Santarpana measures. The Primary principle of Ayurveda Chikitsa is DhatusamayaKriya. Where in the Dhatu here refers to three Doshas, Sapta-Dhatu & Swedadi Malas. The Prakruta-Avastha of these Dhatu’s potentially discharging their function supporting the body is called Swasthya (health). Similarly when there are derangements in these Dhatu’s in either its formation or functions causes, Vikruti or Aswasthya. In Karshya, the Prakupita vata causes Jataragnimandya leading to Upashoshana of Rasadhatus further causing Alpa-Poshana of Uttorotalaradhatu, disturbing the harmony of the physical body.

Thus it can be rightly correlated to under nutrition condition where in Physical health is deteriorated. The right Dravya chosen according to Dosha karma are the most powerful to correct the condition. Where in, Acharya charaka mentions the Brimhana gana dravyas which are bulk promoting in action, is the right management in Karshya to correct the Physical health. The trial drug has shown the Brimhana effect on the body tissues. The accelerated increase in body weight is due to the compound drugs possessing, Madhura-Rasa in common Guru, Snigdha and Pichila guna and Madhura-vipaka. Based on Samanya–Vishesa Siddhanta the opposite gunas of vata like guru, snigdha helps to do Vatashamana and the karmas which can be attributed based on its therapeutic utility and Dravyashritha gunas like Agnikara, Brimhana, Balakara, Dhatu-Ojo-Balakara, Varnakara, Kshatakshyan (Sida cordifolia), Kshatanut, Rasayana, have attributed the action and also correcting the impairment in Physical dimension of health, which is reflected in underweight subjects.

The Anuras present in the Dravyas are Katu, Tikta and Kashaya with Ushna-guna and Katu-vipaka might have corrected the Jataragnimandya and have brought Srotoshodhana effect. Thus, helped in formation of potent Poshaka-rasa dhatu which have in turn helped in Uttarotara-dhatuposhana. The above properties of compound drug, has corrected the impairments in Dhatus and helped in potentially discharging their functions. Thus it can be interpreted that the physical dimensions of health like a good complexion, a clear skin, bright eyes, lustrous hair, with a body well clothed, with firm flesh not too fat, a sweet breath, a good appetite, are achieved.

Adding one more wing to the trial drug compound for its Brimhana effect, it can be said that the nutrients present in herbs have added more value. Nutrients in Dugdhiya13—effective nutrients like Alpha and Beta amyrin, Flavanoids, Cycloartenol, Gallic acid, Myricitrin, Tannins, Tartaric acid, Gallic acid, B Sitosterol Glucoside. Nutrients in Ashwagandha14 like Withanolides, Iron, Acetic acid, alamine, amino acids, glucose, glycosides, sugar, vitamin E, calcium, glutathione, lactone, paradoyl, starch, sucrose, vitamin A, sulphur, Zingiberene, volatile oil. Calories–10 K cal/2.7g, Total Carbohydrate–2g, Dietary fibres–1g, Calcium–1%, Iron–7%. Nutrients in
**Shatavari**\(^{15}\) – various minerals are abundantly present in *shatavari* roots like iron, copper, manganese, zinc and cobalt. Other minerals present in good quantity include calcium, magnesium, selenium and potassium. Vitamins such as vitamin- A, K, E, ascorbic acid, Essential fatty acid such as gamma linolenic acid, Calories– 20 Kcal/100g, Carbohydrates–3.38g, Protein–2.20g, Total fat–0.12g, Dietary fibres–2.1g\(^{16}\). Nutrients in *Bala*\(^{17}\) – Alkaloids, carbohydrates, glycosides, fixed oils, fats, glycosides, steroids, flavanoids, saponins, proteins, amino acids, beta sitosterol, Ephedrine, Gallic acid, Phytosterols, Asparagine, Betaine, sterols, Choline, Mucilage, Tannins, Vasicine. Nutrients in *Vanakarpasa*\(^{18}\) – Flavonoids, Quercetin, Tannins, Triterpenoids. Nutrients in *Vidarikanda*\(^{19}\) – B Sitosterol, Gluconic, Malic acid, Stigmasterol, Hydroxyturerosone, Pterocarps, Tuberosin. Nutrients in *Vriddadaru*\(^{20}\) – Argemoneochroleuca, arginine, arginine pidolate, arginine pyroglutamate. The nutrients present in the compound drug have effectively corrected the both macro and micro nutrients thus by acting as nutritional supplementation in the present study.

**CONCLUSION**

The present clinical study was planned to study the effectiveness of *Brimhaniya gana dravya Khanda* in promoting body weight & physical health among lean subjects. The *Brimhana khanda* has provided statistically significant results on the parameters of *Karshya* i.e. underweight by increasing weight and also in positive promotion of overall physical health in all the subjects selected for the study. No adverse effects were reported during the entire study period. The present clinical study was carried out on a limited number of patients. Hence, an extended study with more clinical parameters and on a large number of patients can be considered to precisely find the effect of treatment.

**Fig. 1: Ingredients of the trial drug- Brimhana Khanda**

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