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# RESPONSE OF PASCHIMOTTANASANA AND KAPALABHATI ON ANTHROPOMETRIC PARAMETERS IN OBESE INDIVIDUALS AS PER PRAKRITI

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**ABSTRACT**

Modernization, affluence, science and technological development have lead to still more sedentary life styles. By exposing oneself to all these factors human beings have unknowingly invited a number of diseases. Among which obesity is one of the most hazardous factor. Some Yoga postures like Paschimottanasana and Kapalabhati help to reduce weight with significant health benefits. But their response in obese individuals as per Prakriti was different; it may be due to change of Doshic composition in different individuals, i.e. main dominating factor in formation of Prakriti. Total 60 grade-1 obese subjects diagnosed as per WHO criteria were registered in Department of Kriya Sharir BHU Varanasi, India. These subjects were divided into two groups by random sampling method in group I and II. Group-I individuals were advised diet restriction plan whereas subjects of group II were suggested with Paschimottanasana and Kapalabhati as well as diet restriction plan. All the individuals were evaluated for anthropometric parameters like weight, BMI, WC, HC, WHR, BF % and VF %. For intra group comparison and inter group comparison paired sample t-test and independent sample t-test was applied. Statistical analysis showed highly significant response in terms of reduction in values for all the anthropometric parameters as per Prakriti after performing Paschimottanasana and Kapalabhati along with diet restriction in group II. Our study concludes that regular practice of Paschimottanasana and Kapalabhati along with diet restriction is more helpful in reducing obesity and this reduction was more in Kapha Vata Prakriti individuals.

**Keywords:** Obesity, Prakriti, Paschimottanasana and Kapalabhati.

## INTRODUCTION

In Ayurveda obesity is regarded as Medoroga, a disorder of Meda Dhatu. Atisthaulya has been considered a condition under Ashtanindaneeya chapter as well as 'Santarpan Janya Vikara' by Charaka.[1] Obesity is a leading preventable cause of death worldwide, with increasing prevalence in adults and children, and authorities view it as one of the most severe public health tribulations of the 21st century.[2] In modern era with continuous changing life styles and environment, altered dietary habits, man has become the victim of many diseases and obesity is one of them. Excess deposition of adipose tissue is obesity. A body weight 20 % or above desirable weight for age, sex and height is regarded as obese. World Health Organization defined obesity as a common chronic disorder of excessive body fat and has become a global epidemic which is present not only in the industrialized world but also in many developing and even in underdeveloped countries.[3] India ranks amongst top ten obese nations.[4] In India BMI greater than 25 is considered as obesity.[5] Obesity is associated with wide range of health conditions including weight related health problems which can cause symptoms such as shortness of breath, difficulty in breath during activity, snoring, skin abnormalities including stretch marks, acanthosis nigricans,[6] poor mobility,[7] joint and back pain[8] and infertility.[9] Obesity increases many abnormalities like high cholesterol level, high blood pressure, metabolic syndrome, coronary heart disease, heart failure, diabetes or high blood sugar level (insulin resistance or pre-diabetes), cancer of breast, uterus, ovaries, colon, prostate, kidney and pancreas, gallstones and associated other disorders,[10] respiratory diseases such as COPD and asthma.[11] Obesity occurs as a result of lack of physical activity with increased intake of food.[12] The industrialization,[13] dietary habits, lack of exercise and various varieties among the daily diet e.g. fast food, freezed fruits, increased amount of soft drinks and beverages, canned foods results into the clinical entity i.e. obesity.[14] In Ayurveda etiology of Sthaulya is categoriesd in to four types i.e. dietary causes (Substances having Kapha increasing quality- heavy, sweet and oily food substances like dairy products, intake of food in excessive quantity and intake of food without digesting previous one), life style and behavior (lack of exercise, day sleep, lack of indulgence in sex), mental cause (free from anxiety, grief and always remains happy) and genetic cause.[1] Charaka has very clearly mentioned the features of obese individuals as movable buttocks, abdomen and breast, excessive increase of adipose and muscles tissue. Besides these features, Ashta Dosha of obesity which are decreased lifespan, laziness, difficulty in sexual activity, weakness, foul smell from the body, excessive sweating, increased appetite and thirst have been described in Charaka Samhita whereas these Dosha have been narrated as features of obesity in Sushruta Samhita and Ashtanga Samgraha.[15-17] Prakriti means the physical constitution of a person and is the science of nature that determines the disposition of a person. Qualitative and quantitative, unchangeable Doshik predominance throughout the life of an individual is called as Prakriti. It expresses unique trait of an individual that is defined by definite and everlasting composition of Dosha at the time of conception.[15] In Ayurveda, Prakriti of an individual has a genetic and acquired aspect. The genetic aspect depends upon Shukra and Shonita while acquired aspect depends upon

environmental factors like climate, season, time factor, age and personal habits.[16] Prakriti is an important concept of Ayurveda that includes physical constitution, psychological constitution and susceptibility to disease, life style, prevention, diagnosis and treatment of diseases of an individual. Thus treatment considers the individual as a whole rather than just focusing on the disease only. Once Prakriti of an individual is determined the treatment is carried in such a way that helps in obtaining an optimal health status.[18] Tridosha are basic factors responsible for health and disease. Vata, Pitta and Kapha i.e. Dosha are biological expression of Mahabhoota. They govern all the functions of body and mind but on vitiation produce the diseases. Each Dosha possesses specific qualities or attributes. Prakriti assessment is not only categorization of individuals based on phenotypes but also evaluation of these attributes to estimate dominance of particular Dosha. These attributes are defined according to pharmacological actions and form the basis for diagnosis, treatment and diet and lifestyle advice. The concept of Prakriti in Ayurveda is similar to pharmacogenomics and Ayurveda Prakriti type and CYP2C19 gene polymorphism is associated with the metabolic variability.[19] Yoga is an ancient restraint intended to bring steadiness and health to the physical, mental, emotional and spiritual dimensions of the individual. Yoga comprises eight aspects i.e. Yama (universal ethics), Niyama (individual ethics), Asana (physical postures), Pranayama (breath control), Pratyahara (control of the senses), Dharana (concentration), Dhyana (meditation), and Samadhi (bliss).[20] Kapalabhati or Bhalabhai (in the Gheranda Samhita), is an important part of Shatkarma, the yogic system of body cleansing techniques.[21] People perform Kapalabhati for weight loss because it works on the respiratory system and the abdominal muscles which helps to improve body tone.[22] Kapalabhati clears the respiratory passages, minimizes risks of infections and allergies in the respiratory system.[23] Paschimottanasana is considered to be one of the best Yogic postures. Several traditional Yogic texts consider Paschimottanasana as a destroyer of all morbidities. In this Asana the back of the whole body is intensely stretched, as the name denotes.[21,24,25]

**Aims and Objectives**

To evaluate the response of Paschimottanasana and Kapalabhati along with diet restriction in obese individuals on anthropometric parameters as per Prakriti

**Inclusion criteria**

- Both male and female subjects with age group 25 -55 years.
- Obese subjects with, grade I obesity (30-34.9) assessed by body mass index (BMI) as per WHO criteria.
- Waist hip ratio: Male > 0.7, Female > 0.9.

**Exclusion criteria**

- Age < 25 years and > 55 years.
- Obese individuals with any organic lesions and metabolic disorders like hypothyroidism, hypogonadism, hypercortisolism, etc.
- Obese female with pregnancy and lactation.
- Obese individuals with any type of addiction like smoking, alcohol, tobacco chewing etc.
- Obese individuals with any cardiovascular complications, liver disorders, renal complications and locomotor disabilities.

**Design**

A prospective comparative study to assess the effect of Paschimottanasana, Kapalabhati and diet restriction was conducted in urban community of Varanasi, India.

## MATERIALS AND METHODS

This study was conducted in Department of Kriya Sharir Faculty of Ayurveda IMS BHU Varanasi, India during September 2012 to November 2013 and approved by the ethical committee of institute of medical sciences BHU vide letter No Dean/2012-13/538 dated 21-03-2012. Obese individuals were selected and thoroughly examined for the assessment of health. Total 60 obese grade-1 individuals (33 female and 27 male) who have satisfied the inclusion criteria of this work were enrolled. These individuals have been divided in to two groups which are as follows:

**Group-1**

In this group, 30 obese individuals were selected and suggested only diet restriction of 1600 Kcal/day. When these individuals were examined as per Prakriti, 17 individuals were Kapha- Vata (KV) Pradhan Prakriti whereas 13 individuals were Kapha- Pitta (KP) Pradhan Prakriti.

**Group-2**

In this group, 30 obese individuals were selected and suggested for life style modification including specific Yogic techniques Kapalabhati 50 times/day, Paschimottanasana 20 times/day and few warm up exercises of 10 sets of upper body and 10 sets of lower body every day at early morning during the program along with diet plan of 1600 Kcal/day as per proforma for 90 days. When these individuals were examined as per Prakriti, 16 individuals were of Kapha- Vata Pradhan Prakriti whereas 14 individuals belonged to Kapha- Pitta Pradhan Prakriti as mentioned in Table 1.

**Procedure**

Study procedure was explained to each participant according to group that is about diet restriction of 1600 Kcal/day to group I and Yogic interventions (Paschimottanasana and Kapalabhati) and diet restriction of 1600 Kcal/day was explained and demonstrated to group II.

Group I was given proforma for diet recommendation of 1600 kcal/day for 90 days.

Group II subjects were demonstrated Pranayama (Kapalabhati), Paschimottanasana as well as given proforma for diet recommendation of 1600 kcal/day for 90 days. Frequency of Yogic technique was Kapalabhati 50 times/day and Pachimottanasana 20 times/day along with diet plan of 1600 Kcal/day as per proforma under supervision. These individuals have also performed few

warm up exercises of 10 sets of upper body and 10 sets of lower body every day at early morning during the program. For both the groups, follow up was done after three months. Initially and after three months all the parameters were assessed i.e. Weight, Body Mass Index (BMI), Skin fold thickness (SFT), Waist circumference (WC), Hip circumference (HC), Waist -Hip Ratio (WHR), Body fat% (BF %) and Visceral fat% (VF %). Skin fold thickness was measured in erect posture of volunteer by fisher scientific digital caliper in and supra iliac region at the end of several consecutive natural breaths. The OMRON body composition monitor was used for the measurement of body fat% and visceral fat%. Measurements were done by using protocol as mentioned in manual of OMRON body composition monitor.

**Prakriti analysis**

Assessment of Deha Prakriti was done by proforma prepared by Piyush Tripathi *et.al*, 2010 for assessment of Deha Prakriti based on characters mentioned in Charaka Samhita.[26] The proforma has been designed in such a way that each trait/ character as described in Charaka Samhita Vimana Sthana was converted into simple question/ statement. The respondents had to record their agreement or disagreement with the statement/question in a column provided for the purpose in the form of YES or NO. The scores to be allotted were specified against the statement in a separate column for a particular type of response. It was clearly mentioned that if the response of the individual was other than that mentioned in the column, the scores to be allotted were ZERO. At the end of this exercise, the subjects could calculate the scores for different Dosha themselves and could comprehend the Doshik dominance in the form of percentage with the help of simple mathematical calculations. On the basis of these proforma when Prakriti analysis was done in all 60 individuals, percentage of Kapha Dosha was found to be more in all individuals so Kapha Dosha is considered as primary Dosha and Vata, Pitta was considered as secondary Dosha according to their percentage.

**Data analysis**

The analysis of data was done by using statistical software SPSS version 16.0. To evaluate the response from initial to three months of follow up, for intra group comparison paired sample t-test was applied whereas for inter group comparison independent sample t-test was applied.

## RESULTS

All the sixty enrolled subjects completed the study. There was no baseline difference between the groups and thus both the groups were comparable. When the mean of difference of after and before Yogic intervention was compared within the group for both Prakriti KV and KP no statistically significance ($p > 0.05$) was observed in all anthropometric parameters as showed in Table 2. When the mean of difference, after and before Yogic intervention was compared between the group as per Prakriti, statistically highly significant ($p < 0.01$) reduction was noticed in weight, BMI, waist circumference, waist to hip ratio, skin fold thickness and visceral fat percentage whereas statistically significant ($p < 0.05$) reduction for hip circumference and body fat percentage for KV Prakriti. In KP Prakriti statistically highly significant ($p < 0.01$) reduction was evaluated in weight, waist circumference, skin fold thickness, body fat and visceral fat percentage whereas significant decrease was seen in BMI, hip circumference and waist to hip ratio which is evident from Table 3.

## DISCUSSION

**BMI and Weight**

On intra group comparison of BMI and weight as per Prakriti response was not found significant in both the groups in spite of decrease. (Table 2) This might be due to similar dominant Dosha i.e. Kapha. To assess the response effect of both the interventions when inter group comparison was done as per Prakriti, decrease in weight and BMI of both the Prakriti group was more in KV Prakriti individuals of group 2. (Table 3) This decrease in KV Prakriti might be due to involvement of Vata as secondary Dosha. As it is well known that Vatic individuals are more active and respond quickly.

**Skin fold thickness**

On intra group comparison as per Prakriti, no statistical significance was noted in both Prakriti individuals (Table 2). It is probably due to dominancy of Kapha Dosha in both the Prakriti individuals. On intergroup comparison for both KV and KP Prakriti, decrease in SFT was almost similar in both Prakriti individuals of group 2 ($p \leq 0.001$). This shows almost similar response in both the Prakriti. (Table 3)

**WHR**

On intra group comparison as per Prakriti, no statistical significance was found in both the group. (Table 2) It is probably due to Mand Guna of Kapha which is dominating in both the Prakriti individuals. On intergroup comparison for both Prakriti as shown in Table 3, decrease in waist hip ratio was more in KV Prakriti ($p < 0.01$) in group 2. This may be due to increased activity of Vata Dosha which is a secondary Dosha in KV Prakriti.

**Body fat and visceral fat**

When this difference in body fat% and visceral fat% was compared as per Prakriti, no statistical significance was found in both the groups in spite of decrease in Body fat% and visceral fat%. (Table 2) This might be due to similar dominant Dosha. To consider the effect of both the interventions when this change was compared in between the groups as per Prakriti, in KV Prakriti significant ($p < 0.05$) change was noted in body fat% whereas highly significant ($p < 0.001$) change in visceral fat%. In KP Prakriti individuals marked reduction in both body fat% and visceral fat% was apparent ($P < 0.001$). (Table 3) Better response of Paschimottanaasana and Kapalabhati in terms of reduction in body as well as visceral fat% may be due to better metabolism in KP Prakriti individuals in comparison to KV Prakriti.

**Table 1: Division of group as per Prakriti and gender was as follows**

| Group | KV Prakriti | KP Prakriti | Male | Female |
|---|---|---|---|---|
| Group-1 | 17 (56.67 %) | 13 (43.33 %) | 13 (43.33 %) | 17 (56.67 %) |
| Group-2 | 16 (53.33 %) | 14 (46.67 %) | 14 (46.67 %) | 16 (53.33 %) |
| Total | 33 (55 %) | 27 (45 %) | 27 (45 %) | 33 (55 %) |

KV (Kapha- Vata), KP (Kapha- Pitta)

**Table 2: Response of Kapalabhati, Paschimottanasana and diet restriction on anthropometric parameters in obese individuals within group as per Prakriti**

| Variables | Mean ± SD of difference of AT and BT | | | | | |
|---|---|---|---|---|---|---|
| | Group-1 (n = 30) | | | Group-2 (n = 30) | | |
| | Prakriti | | Between Prakriti comparison Independent sample t- test | Prakriti | | Between Prakriti comparison Independent sample t- test |
| | KV (n = 17) | KP (n = 13) | | KV (n = 16) | KP (n = 14) | |
| Weight (kg) | 2.0 ±1.0 | 2.38 ±1.04 | t=1.02 p=0.34 | 5.50 ±1.5 | 4.86 ±1.46 | t=1.18 p=0.25 |
| BMI (kg/m$^2$) | 0.64 ±0.40 | 0.92 ±0.44 | t=1.79 p=0.08 | 2.09 ±0.50 | 1.84 ±0.92 | t=0.93 p=0.36 |
| SFT (cm) | 0.20 ±0.10 | 0.17 ±0.11 | t=0.80 p=0.43 | 0.67 ±0.26 | 0.68 ±0.25 | t=0.04 p=0.97 |
| WC (cm) | 0.96 ±0.50 | 0.97 ±0.48 | t=0.02 p=0.98 | 3.73 ±1.48 | 3.3 ±1.52 | t=0.80 p=0.43 |
| HC (cm) | 0.28 ±0.24 | 0.28 ±0.33 | t=0.004 p=0.99 | 1.62 ±1.76 | 1.73 ±1.81 | t=0.17 p=0.87 |
| WHR | 0.005 ±0.006 | 0.01 ±0.007 | t=1.7 p=0.1 | 0.021 ±0.016 | 0.017 ±0.011 | t=0.76 p=0.45 |
| BF (%) | 1.28 ±2.45 | 0.78 ±0.28 | t=0.71 p=0.48 | 3.11 ±1.45 | 2.88 ±0.66 | t=0.55 p=0.58 |
| VF (%) | 0.53 ±0.22 | 0.56 ±0.15 | t=0.37 p=0.71 | 2.09 ±0.51 | 1.73 ±0.65 | t=1.7 p=0.09 |

BMI (Body mass index), SFT (Skin fold thickness), WC (Waist circumference), HC (Hip circumference), WHR (Waist – Hip ratio, BF % (Body fat percentage), VF % (Visceral fat percentage)

**Table 3: Intergroup comparison to assess the response of Kapalabhati, Paschimottanasana and diet restriction on anthropometric parameters in obese individuals as per Prakriti**

| Variables | Mean ± SD of difference of AT and BT | | | | | |
|---|---|---|---|---|---|---|
| | KV- Prakriti (n = 33) | | | KP- Prakriti (n = 27) | | |
| | Group 1 (n = 17) | Group 2 (n = 16) | Between group comparison Independent sample t- test | Group 1 (n = 13) | Group 2 (n = 14) | Between group comparison Independent sample t- test |
| Weight (kg) | 2.0 ± 1.0 | 5.5 ± 1.50 | t=7.91 p<0.001 | 2.3 ± 1.04 | 4.85 ± 1.46 | t=5.02 p<0.001 |
| BMI (kg/m$^2$) | 0.64 ± 0.40 | 2.09 ± 0.49 | t=9.1 p<0.001 | 0.92 ± 0.43 | 1.84 ± 0.92 | t=3.27 p=0.003 |
| WC (cm) | 0.96 ± 0.50 | 3.70 ± 1.47 | t=7.27 p<0.001 | 0.96 ± 0.48 | 3.29 ± 1.52 | t=5.24 p<0.001 |
| HC (cm) | 0.28 ± 0.24 | 1.61 ± 1.76 | t=3.10 p=0.004 | 0.27 ± 0.33 | 1.72 ± 1.81 | t=2.84 p=0.009 |
| WHR | 0.005 ± 0.006 | 0.021 ± 0.016 | t=3.7 p=0.001 | 0.01 ± 0.007 | 0.017 ± 0.011 | t=2.06 p=0.04 |
| SFT (cm) | 0.20 ± 0.10 | 0.67 ± 0.25 | t=7.02 p<0.001 | 0.16 ± 0.11 | 0.67 ± 0.25 | t=6.64 p<0.001 |
| BF (%) | 1.28 ± 2.45 | 3.11 ± 1.44 | t=2.5 p=0.014 | 0.78 ± 0.28 | 2.87 ± 0.66 | t=10.47 p<0.001 |
| VF (%) | 0.53 ± 0.22 | 2.09 ± 0.51 | t=11.4 p<0.001 | 0.56 ± 0.15 | 1.72 ± 0.64 | t=6.32 p<0.001 |

BMI (Body mass index), SFT (Skin fold thickness), WC (Waist circumference), HC (Hip circumference), WHR (Waist – Hip ratio), BF % (Body fat percentage), VF % (Visceral fat percentage)

## CONCLUSION

On intra group comparison as per Prakriti weight, BMI, ST, WC, HC, WHR, BF% and VF% were reduced but on statistical analysis no significance was found. On intergroup comparison as per Prakriti all the anthropometric parameters significantly reduced and this reduction was more in KV Prakriti except HC and BF% which was reduced significantly more in KP Prakriti individuals. On the basis of these findings we can also infer that to control obesity Paschimottanasana and Kapalabhati along with diet restriction is more effective than diet restriction alone.

### Limitations of the Study

- The method for assessment of Prakriti needs to be further standardized and a universally acceptable and applicable tool needs to be devised.
- Present study is a short term therefore for the evaluation of long term effect of Paschimottanasana and Kapalabhati as per Prakriti, further study is required with large sample size.

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