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Research Article

STUDY THE EFFECT OF SPECIFIC CARDIO-VASCULAR EXERCISE ON BMR W.S.R. TO *SHARIRA PRAKRUTI*

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KEYWORDS: Specific Cardio-Vascular Exercise, BMR, *Sharira Prakruti.*

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ABSTRACT

Basic principles of Ayurveda mainly concern with *Sharira Kriya*, gives knowledge about *Dhosh*, *Dhatu*, and *Mala* etc. According to Ayurvda *Prakruti* is a factor which originates in a person right from the time of conception and it determines the physical and mental attributes of man. *Prakriti,* the build and constitution of the human body is a sum total of morphological, physiological and psychological traits of human beings. *Prakriti* of a man has genetic and acquired aspect; the genetic aspect depends upon *Shukra* and *Shonita,* while acquired constitution develops in relation to environmental factors like climate, season, time factor, age, race and individuals (*Pratyatmniyta*). According to Ayurveda, *Prakruti* analysis is an important concept, which describes the constituency of a person healthy or diseased. The *Prakruti* analysis is based on *Shareerika* and *Manasika Gunas*. Today, the BMR is used as a measure of an individual's metabolism, which changes with age, weight, height, and a variety of medical conditions. A person's exercise habits may affect their BMR. A daily routine of cardiovascular exercise can improve health and fitness and increase BMR. Exercise and fitness has become an obsession in popular culture hence number of studies were done. The concept of *Prakruti* plays major role in this regard, hence with an academic interest to know the possible relation of *Prakruti*, BMR and Cardio-vascular exercise so this topic was undertaken.

INTRODUCTION

Ayurved is an ancient science which deals with every aspect of human life. There are many scientific concepts in Ayurveda which needs detailed scrutiny to assess their utility in the field of science. Ayurveda is the science of life which not only deals with the treatment of diseases but also maintains the health in individuals is its prime goal. Therefore every research in Ayurveda gives emphasis to health prophylaxis along with treatment.[1] According to Ayurveda *Prakruti* is a factor which originates in a person right from the time of conception and it determines the physical and mental attributes of man.[1,2,3] *Prakriti,* the build and constitution of the human body is a sum total of morphological, physiological and psychological traits of human beings. *Prakriti* of a man has genetic and acquired aspect; the genetic aspect depends upon *Shukra* and *Shonita,* while acquired constitution develops in relation to environmental factors like climate, season, time factor, age, race and individuals (*Pratyatmniyta*).

The relation of person to any kind of physical and mental stimuli depends on him/her *Prakruti.* Therefore; *Prakruti* is analyzed based on the physical and mental characteristics of an individual. The basic metabolic rate measures the minimum amount of energy to maintain physiological function at rest. The knowledge of this rate is important in clinical application for defining appropriate nutrition support and determining

caloric needs for energy balance. Cardio-vascular exercise also known as aerobic exercise. It includes activities such as running, jogging, cycling, biking, swimming etc. A daily routine Cardio-vascular exercise can improve the health, fitness and also increases BMR.[4]

The effect of Cardio-vascular exercise on BMR and its relation with *Prakruti* is an important subject hence an attempt is made to study it.[5]

Selection of Topic

- According to Ayurveda, *Prakruti* analysis is an important concept, which describes the constituency of a person healthy or diseased.
- The *Prakruti* analysis is based on *Shareerika* and *Manasika Gunas*.
- Today, the BMR is used as a measure of an individual's metabolism, which changes with age, weight, height, and a variety of medical conditions. A person's exercise habits may affect their BMR.
- A daily routine of cardiovascular exercise can improve health and fitness and increase BMR.
- Exercise and fitness has become an obsession in popular culture hence number of studies were done.
- The concept of *Prakruti* plays major role in this regard, hence with an academic interest to know the possible relation of *Prakruti*, BMR and Cardio-vascular exercise so this topic was undertaken.

Aims and Objectives

Aim: The effect of specific cardio-vascular exercise on BMR and its correlation with *Prakruti*.

Objectives

- The concept of *Sharira Prakruti* from Ayurvedic *Samhitas* was studied in detail and the references were compiled.
- The BMR from all modern texts was studied and references were compiled.
- The cardiovascular exercises from modern texts were studied and references were compiled.
- The correlation between *Sharira Prakruti*, BMR and Cardiovascular exercise were studied statistically.

Materials & Methods

1. Ayurvedic *Samhitas*
2. Modern text and techniques
3. Standard equation for BMR calculation, according to Harris Benedict Formula,
4. BMR=66.4730+ (13.7516 x wt in kg)+ (5.0033 x ht in cm) - (6.7550 x age in years).
5. Specific cardiovascular exercise for two months according to British Journal of Nutrition (1989) 61, 155-173.

Week no.	Daily Schedule
1-2	1 hrs of 5 min walking 5 min running 5 min rest
2-3	1 hrs of 10 min running 5 min rest
3-4	15 min running
4-5	20-25 min running
5-6	25-30 min running
6-7	30-35 min running
7-8	35-40 min running

Inclusion Criteria

1. 50 volunteers who were newly joined the Abhijit Dada Kadam
2. Cricket Club B.V.D.U. Pune.
3. Age between- 10-16 yrs.
4. Only male volunteers were selected.

Exclusion Criteria

1. Volunteers suffering from any major illness were excluded
2. Female volunteers were excluded.
3. Volunteers, whose age below 10 years or above 16 years were excluded.

Methodology

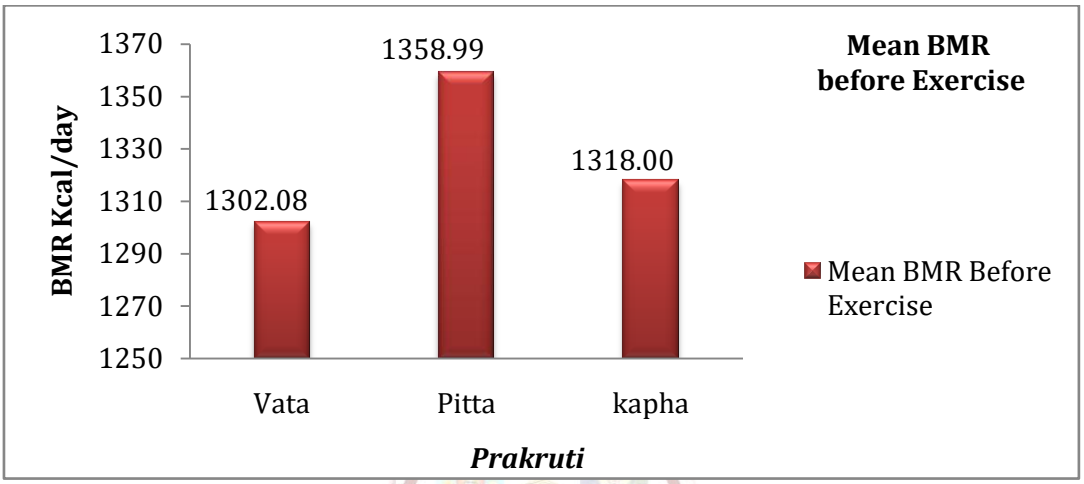
1. 50 volunteers between the age group of 10 to 16 years were selected for the study.
2. *Sharira Prakruti parikshan* of 50 volunteers was done with the help of standard *Prakruti parikshan* Proforma by C-DAC Ayu soft (Centre for Development of Advanced Computing - A scientific society of the ministry of communications and information technology, Government of India).
3. The BMR calculation of each volunteer was carried out with the help of standard Harris Benedict formula.
4. Specific cardio vascular exercise was given to the each volunteer in early morning for 2 months.
5. To avoid bias same place, time and standard specific exercise pattern was maintained.
6. At the end of two months again the BMR was calculated.
7. A comparative study was done with the help of collected data such as *Sharira Prakruti* and BMR Kcal/day.
8. Statistical analysis was done with the help of collected data by using ANOVA and Paired 't' test.

Observation

Table 1: Comparison of mean BMR at before exercise with respect to *Vata Pitta* and *Kapha Pradhan Prakruti*

Prakruti	Number of volunteers	BMR		F-value	P-value
		Mean	SD		
Vata	16	1302.08	224.60	0.44	0.644
Pitta	18	1358.99	177.77		
Kapha	16	1318.00	135.68		

By using ANOVA test p-value > 0.05 therefore there is no significant difference between mean BMR at before exercise in *Vata*, *Pitta* and *Kapha Pradhan Prakruti* group.

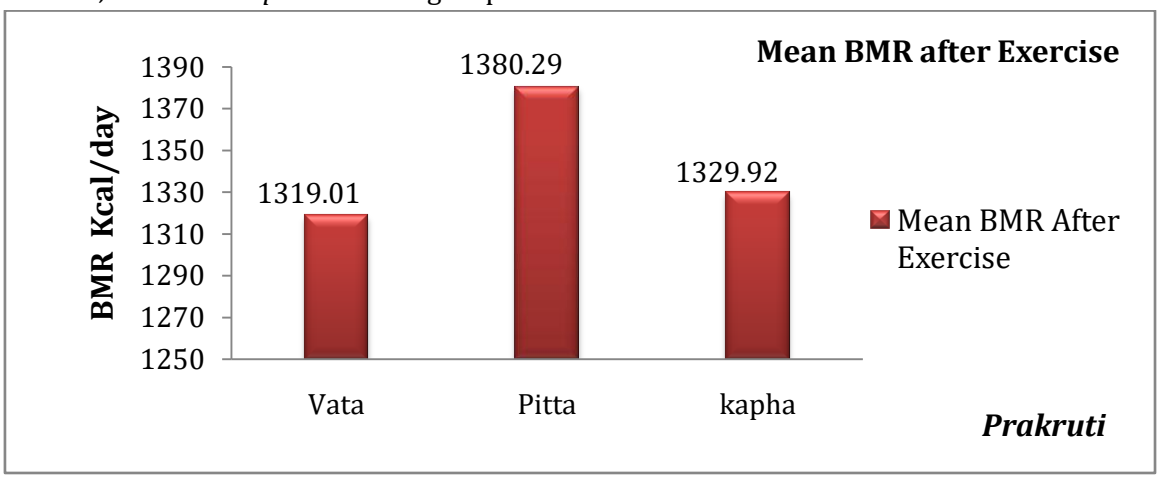


The above graph 1 shows that the difference of mean BMR at before exercise between *Vata*, *Pitta* and *Kapha Pradhan Prakruti*.

Table 2: Comparison of mean BMR at after exercise with respect to *Prakruti*

Prakruti	Number of volunteers	BMR		F-value	P-value
		Mean	SD		
Vata	16	1319.01	225.34	0.53	0.593
Pitta	18	1380.29	188.31		
Kapha	16	1329.92	134.66		

By using ANOVA test p-value > 0.05 therefore there is no significant difference between mean BMR at after exercise in *Vata*, *Pitta* and *Kapha Prakruti* group.

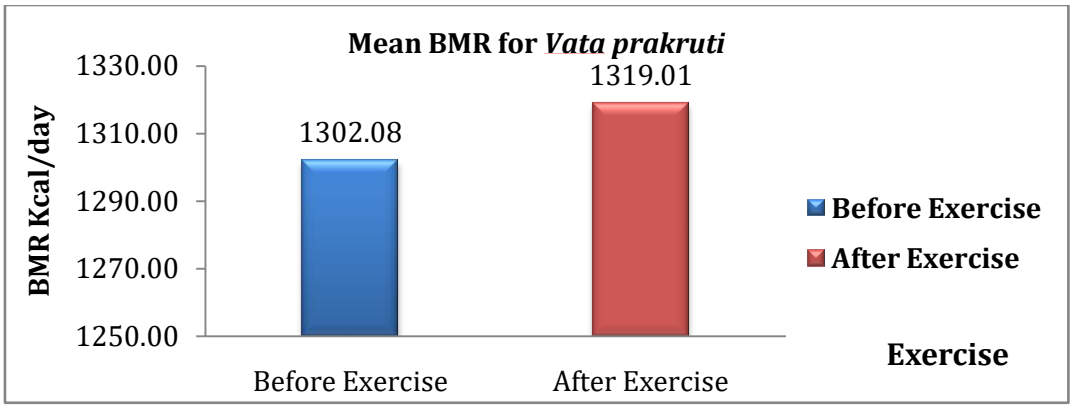


The above graph 2 shows that the difference of mean BMR at after exercise between *Vata*, *Pitta* and *Kapha Pradhan Prakruti*.

Table 3: Comparison of mean BMR at before exercise and after exercise *Vata pradhan prakruti*

BMR at	Number of volunteers	BMR		P-value
		Mean	SD	
Before exercise	16	1302.08	224.60	< 0.001
After exercise	16	1319.01	225.34	

By using paired t-test p-value < 0.05 therefore there is significant difference mean BMR at before exercise and after exercise for *Vata Pradhan Prakruti*.

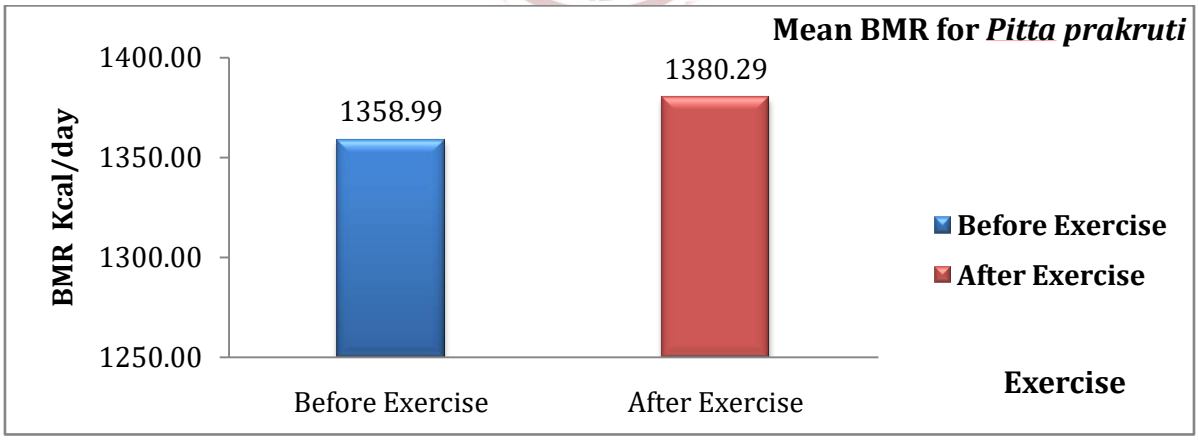


The above graph 3 shows that, mean BMR of *Vata Pradhan Prakruti* after exercise is higher (1302.08) than before exercise (1319.01).

Table 4: Comparison of mean BMR at before exercise and after exercise *Pitta pradhan prakruti*

BMR at	Number of volunteers	BMR		P-value
		Mean	SD	
Before exercise	18	1358.99	177.77	< 0.001
After exercise	18	1380.29	188.31	

By using paired t-test p-value < 0.05 therefore there is significant difference mean BMR at before exercise and after exercise for *Pitta pradhan prakruti*.

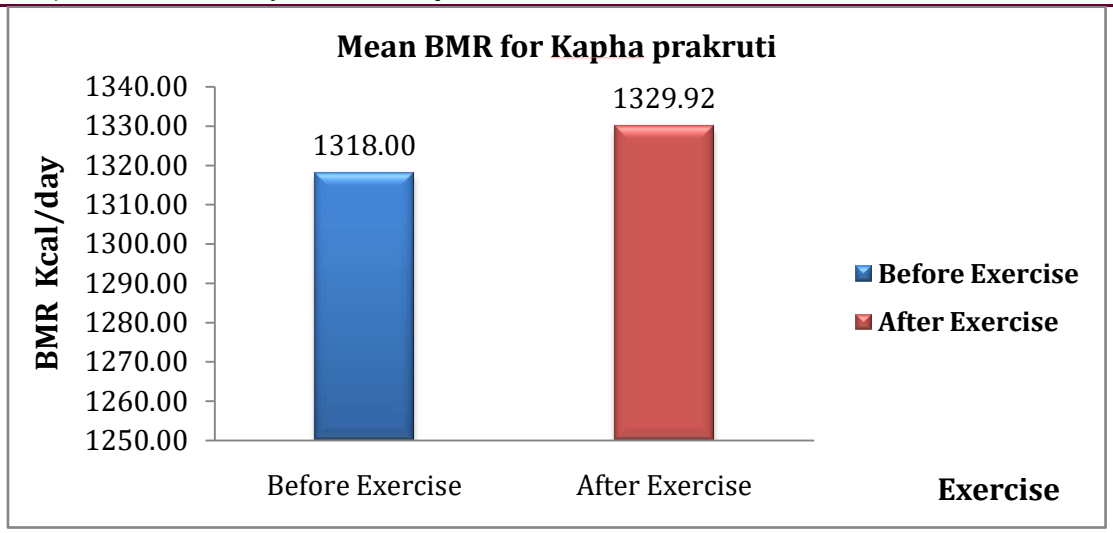


The above graph 4 shows that, mean BMR of *Pitta Pradhan Prakruti* after exercise is higher (1358.99) than before exercise (1380.29)

Table 5: Comparison of mean BMR at before exercise and after exercise *Kapha Pradhan Prakruti*

BMR at	Number of volunteers	BMR		P-value
		Mean	SD	
Before exercise	16	1318.00	135.68	< 0.001
After exercise	16	1329.92	134.66	

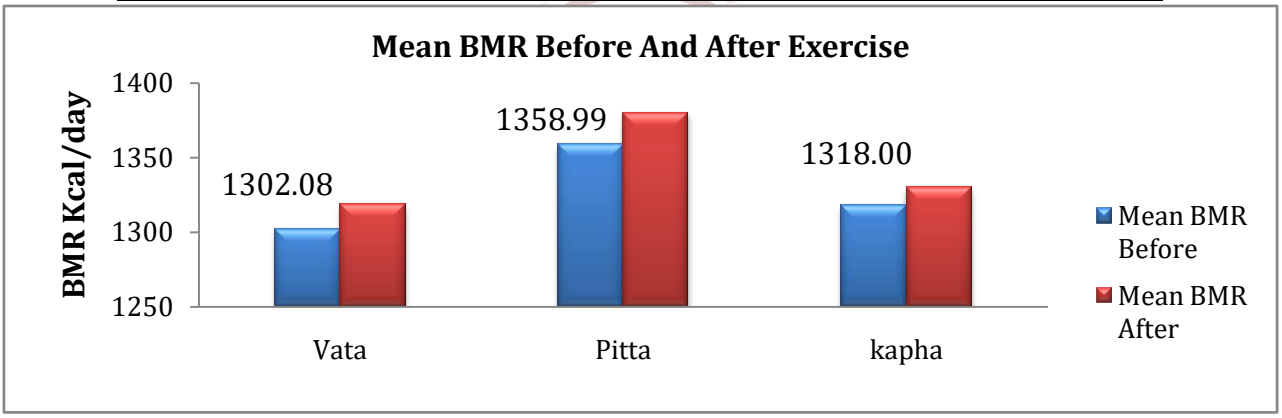
By using paired t-test p-value < 0.05 therefore there is significant difference mean BMR at before exercise and after exercise for *Kapha Pradhan Prakruti*.



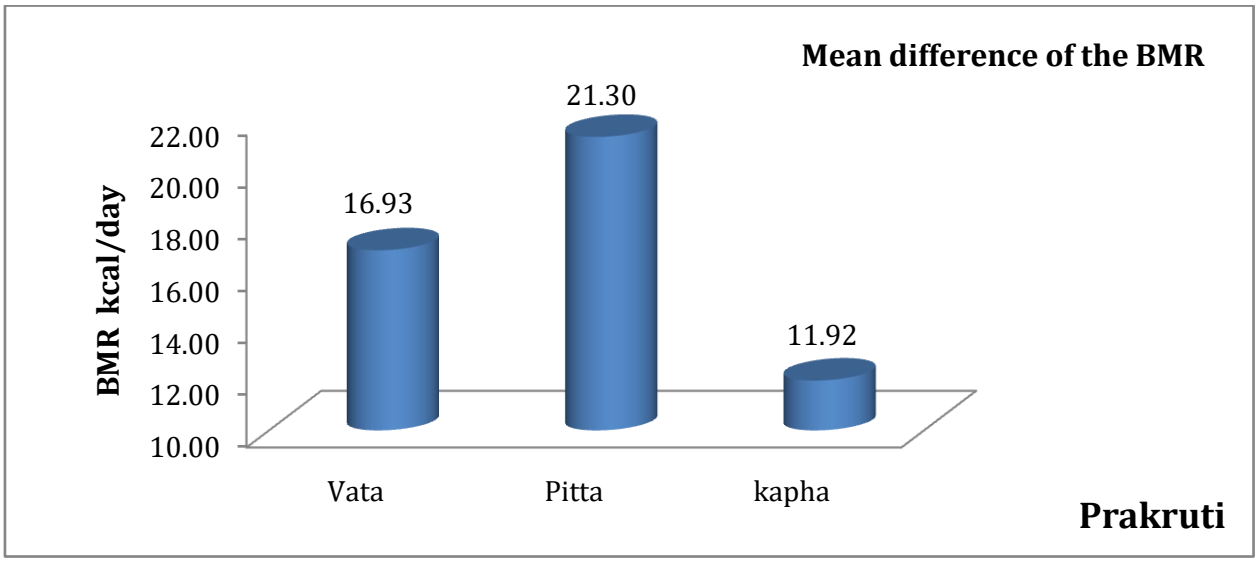
The above graph 2 shows that, mean BMR of *Kapha Pradhan Prakruti* after exercise is higher (1318.00) than before exercise (1329.92).

Table 6: Mean difference of the BMR between before and after exercise

Prakruti	**Mean BMR Before**	**Mean BMR After**	**Mean difference**
Vata	1302.08	1319.01	16.93
Pitta	1358.99	1380.29	21.30
kapha	1318.00	1329.92	11.92



The above graph 6 shows that, comparative study of the mean BMR is increased after exercise than before exercise in all three *Vata Pitta* and *Kapha Pradhan Prakruti*.



The above graph 7 shows that, comparative study of the men BMR difference between before and after exercise in *Pitta Pradhan Prakruti* is higher than *Vata* and *Kapha Pradhan Prakruti*.

DISCUSSION

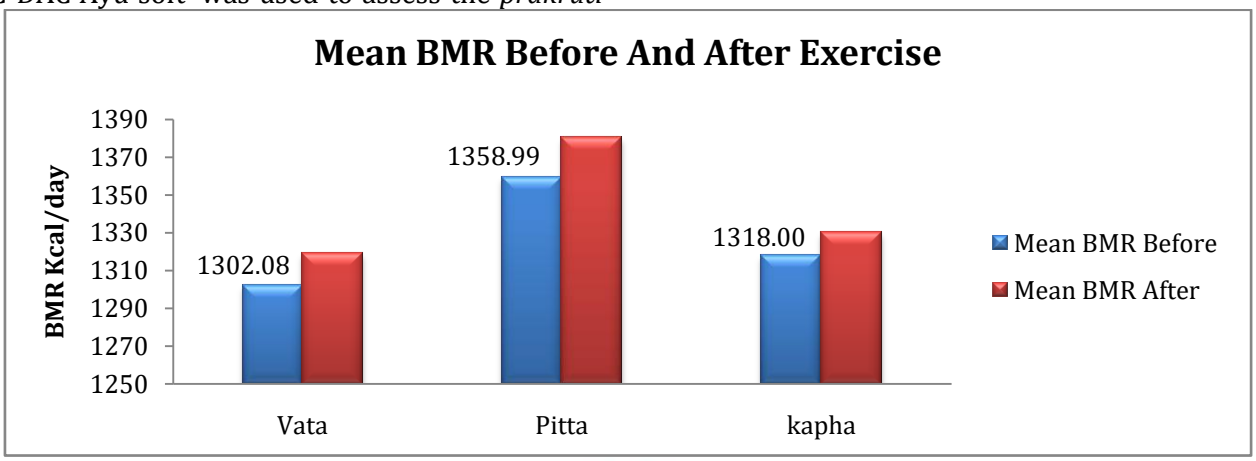
Ayurveda explains all bodily actions based on the status of three *Doshas* i.e., *Vata*, *Pitta* and *Kapha*. All the physiological processes are directly controlled by these *Tridosha*.

The relation of person to any kind of physical and mental stimuli depend on his/her *Prakruti*. These physical stimuli have impact on the basic physiological action of human body but it varies according to *Prakruti*.

The literary work was done with the help of ancient Ayurvedic texts and modern literature in relation with *Prakruti*, BMR and Cardiovascular exercise. A standard '*Prakruti Parikshan* Proforma by C-DAC Ayu soft' was used to assess the *prakruti* of the subjects. A standard equation, according to "Harris Benedict Formula" was used in this project for BMR calculation.

In the practical work, a group of 50 healthy volunteers were taken as subjects for the project. The *Prakruti* and BMR of these subjects were assessed at the beginning of the procedure. Then a set of specific cardiovascular exercise was given to each volunteer in early morning for two months. At the end of two months again BMR was calculated. After two months of exercise reading were noted and the difference in the reading of BMR before and after exercise was compared with BMR.

From observation it was found that, in all three types of *Pradhan Prakruti* i.e. *Vata*, *Pitta* and *Kapha Pradhan Prakruti*, mean BMR difference was increased after exercise than before exercise, as shown in graph number 3, 4, 5. It was proved statistically.



The above graph shows the mean BMR between before and after exercise, with respect to *Prakruti*.

In *Pitta Pradhan Prakruti* mean difference of BMR Between before and after exercise was maximum (21.30) as compared to *Vata* (16.93) and *Kapha* (11.92) *Pradhan Prakrut*, as shown in graph number 7. But statistically it was not significant, due to the small sample size. But to comparative study shows the above difference.

In Charak Samhita the characteristics of the *Doshaja Prakruti* explain in *Viman Sthan Adhyay* 8, According to those characteristics:

The *Guna* of *Pitta Prakruti*: Charak Acharya explains the *Gunas* of *Pitta Prakruti* in Cha. Vi. 8/97, mainly these are *Ushna*, *Tikshana*, *Drava*. Due to that *Gunas* the person having the following *Karma*

Ushna Guna– Excess hunger and thirst

Tikshna Guna– Having strong physical strength, strong digestive power, intake of food and drink in large quantity, frequent eating habits, inability to do difficult situations or any hard work.

***Drava Guna*:** Excessive sweat, urine and faeces.

The *Guna* of *Kapha Prakruti*: Charak Acharya explains the *Gunas* of *Kapha Prakruti* in Cha. vi. 8/96, mainly these are *Manda*, *Staimitya*, *Shita*. Due to that *Gunas* the person having the following *Karma.*

***Manda Guna*:** Slow in any action, intake of food and less movement.

***Staimitya Guna*:** Slow in imitating action, getting, irritated and slowness in having diseases.

***Shita Guna*:** Lack of intensity in hunger, thirst, heat and sweating.

The *Vata Prakruti*: Charak Acharya explains the *Gunas* of *Vata Prakruti* in Cha.Vi. 8/97**,** mainly these are *Ruksha*, *Laghu*, *Shighra*. Due to that *Gunas* the person having the following *Karma.*

***Ruksha Guna*:** *Vataprakruti* person is slim and has a small frame of body which is *Krisha*.

***Laghu Guna*:** Light and inconsistent gait, action, food and movement.

***Shighra Guna*:** Due to *Shighra Guna Vata Prakruti* person acquires diseases quickly. He is quick in initiating only action, getting irritated; the onset of any disease is also quick. Quick in favor, affection likes and dislikes quick in understanding but quick in forgetting things. Further more study can be done with large sample size.

CONCLUSION

BMR increases after exercise than before exercise in all three *Vata*, *Pitta* and *Kapha Pradhan Sharir Prakruti*. Statistically this observation is significant according to paired t-test.

Before exercise comparative study shows that,

1. Mean BMR was maximum in *Pitta Pradhan Prakruti* individuals.
2. Mean BMR was minimum in *Vata Pradhan Prakruti* individuals.
3. Mean BMR was moderate in *Kapha Pradhan Prakruti* individuals.

After exercise Comparative study shows that,

1. Mean BMR was maximum in *Pitta Pradhan Prakruti* individuals.
2. Mean BMR was minimum in *Vata Pradhan Prakruti* individuals.
3. Mean BMR was moderate in *Kapha Pradhan Prakruti* individuals.

The mean difference of BMR at before and after exercise comparative study shows that,

1. *Pitta Pradhan Prakruti* individuals shows maximum difference between before and after exercise than *Vata* and *Kapha Pradhan Prakruti* individuals.
2. *Kapha Pradhan Prakruti* individuals show minimum difference between before and after exercise than *Vata* and *Pitta Pradhan Prakruti* individuals.

Statistically this observation is not significant, may be because of the small sample size according to statistical Anova test.

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