

## **Comparative study of BMI, Abdominal Strength, and Flexibility of people participating and non- participating in different physical activities.**

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### **Abstract**

Physical activities play important role in determining the physical health of an individual. Body Mass Index, The purpose of the study is to compare the important physical parameters of physical health like BMI, abdominal strength & flexibility of people who participate in various physical activities viz. running, walking, yoga, swimming, competitive sports, recreational sports and also of the people who do not participate in any physical activity. 20 male from each activity group and 20 male who do not participate in any physical activity aged between 25- 50 years were selected randomly. Static group comparison test was adopted for the study. The statistical analysis was done using ANOVA,  $P < 0.05$ . The health benefits of physical activities appear to be proportional to nature of activity, intensity & volume. Exercise helps to achieve moderate Body Mass Index, high abdominal strength & flexibility. People involved in competitive sports practice variety of fitness program with high intensity and volume to enhance their sports performance; and hence this group of people exhibited Least Body Mass Index, high flexibility & high abdominals strength. Participation in physical activities with moderate intensity and volume for at least 3-4 days in week enhances the physical health status people.

**KEYWORDS :** BMI, abdominal strength, flexibility, physical activities, physical health

### **INTRODUCTION**

Physical activity is defined as bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level. Physical activity can be categorized basically into aerobic or anaerobic activity depending upon it's nature, intensity & volume. Health benefits of physical activities appear to be proportional to nature of activity. A moderate amount of activity can be obtained by participating in variety of physical activities for at least 20 to 30 minutes in a day at least for three to four days in a week. People choose the physical activities according to their personal preference and life circumstances. Exercise helps to achieve or maintain a healthy weight by burning calories. Burning of calories is directly proportional to intensity of exercise an individual does. By burning more calories than a person take in, he can reduce body fat, giving a healthier body composition.

Body Mass Index, Abdominal Strength & Flexibility are few important physical parameters of physical health of any individual. Physical activities such as running, walking, yoga, swimming, competitive sports, recreational sports play important role in determining the physical health of an individual. People when participate in a general exercise programme based on intensity, volume & variation that combines cardio-respiratory fitness, muscular endurance, muscular strength, flexibility, coordination, and speed is beneficial for improvement of BMI, flexibility of Hip joint & hamstring muscles

and abdominal strength. These are important components for an individual as they reduce many risk factors due to ageing. Abdominal muscles help for moving and balancing, they support the axial skeleton, rib cage, and pelvis so that a person can remain balanced upright. It also helps in lifting & pushing. By strengthening muscles, ligaments, and tendons and promoting flexibility, core exercises help support joints and prevent joint and muscle injuries. When abdominal exercises are combined with a healthy diet and regular cardiovascular exercise, an individual can achieve and maintain healthy weight.

Improving the flexibility of the muscle-tendons and ligaments in the lower back & hamstring muscles increases the range of motion which ultimately improves the functional movement. Hamstring flexibility is highly desirable in most of the sporting activities like running, swimming, dancing, & competitive sports as it is primarily aimed at reducing muscle tears or strains and improving running efficiency, agility, and speed. Practicing yoga helps in improving the flexibility of overall muscles.

#### **NEED FOR THE STUDY**

The available scientific evidence shows that physical inactivity and sedentary life style have become a serious threat to our health and significantly increase the deterioration rate of physical health of people. With the new developments in technology three additional factors- Nutrition, Stress and Environment, have significantly changed our lives and have had a negative effect on human health. The need of the study was to find out how physical activities of different nature with varying intensity & volume can affect the BMI, abdominal strength, and flexibility of physically active and inactive people.

#### **AIM**

To compare the BMI, abdominal strength & flexibility of people who participate in various physical activities viz. Running, Walking, Swimming, Yoga, Competitive sports and Recreational sports and also of the people who do not participate in physical activity.

#### **Objective**

- To study the Body Mass Index (BMI) of males involved in various physical activities along with the males who do not take part in any physical activities.
- To study the Flexibility in male participants involved in various physical activities along with the males who do not take part in any physical activities.
- To find the Abdominal Strength of male participants involved in various physical activities along with males who do not take part in any physical activities.

#### **MATERIALS & METHODOLOGY**

Selection of subjects: Total 120 subjects (20 from each group) were selected for six physical activities for male population and 20 male were selected those who do not participate in any physical activity. All these subjects aged between 25- 50 years were selected randomly from Nagpur city, Maharashtra, India. Only those subjects were considered for the study, who were involved in physical activities for minimum 2 years at least for 20/30 minutes, thrice in a week.

#### **Selection of variables**

Based on the literacy evidences, correspondence with the experts and the researcher's own understanding BMI, Flexibility & Abdominal strength variables were

selected for the purpose of the study: The data was collected for each variable administering their respective tests.

**Collection of Data**

The tests used were explained to the subjects prior to their administration. The data was collected from various physical activity centers where people practice their own interested physical activities early morning before they start physical activities. The data for the non participating group was collected from their residences itself early morning before they start their daily routine. Static group comparison test was adopted for the study.

**Scoring**

Abdominal Strength- Maximum number of correctly executed bent knee sit ups in one minute was recorded.

BMI – It is calculated by dividing the weight in kg by height<sup>2</sup> in meters. The body weight was recorded to the nearest 0.5kg & height is measured to the nearest centimeter.

Flexibility: The best of three attempts for sit & reach test was recorded to the nearest 2 cm.

**Experimental Design**

Static group comparison test was adopted for the study.

**DATA ANALYSIS & INTERPRETATION**

The data obtained after administering the tests were systematically tabulated. A comparative assessment of BMI, Abdominal strength & Flexibility in male people involved in different physical activities was carried out for aged between 25 to 50 years. The statistical analysis was done using ANOVA, P< 0.05

**RESULT**

The result of the study is as shown in the following table:

Table 1: Comparative assessment of the Body Mass Index (BMI) of males involved in various physical activities along with the group with no participation in any physical activity

Parameter	Physical Activity Groups	N	Mean	± SD	SE	Min.	Max.	F ratio	P
BMI	Running	20	25.6	± 3.2	0.7	19.8	31.6	4.097	< 0.05
	Walking	20	26.4	± 2.6	0.6	22.9	33.3		
	Yoga	20	25.9	± 3.8	0.8	20.9	34		
	Competitive Sports	20	21.8	± 5.6	1.3	20	32.6		
	Recreational Sports	20	23.5	± 3.1	0.7	17.1	29.9		
	Swimming	20	25.2	± 3.1	0.7	20.7	32		
	Non Participating Group	20	25.9	± 3.5	0.8	19.4	31.8		
	Total	140	24.9	± 3.9	0.3	17.1	34		

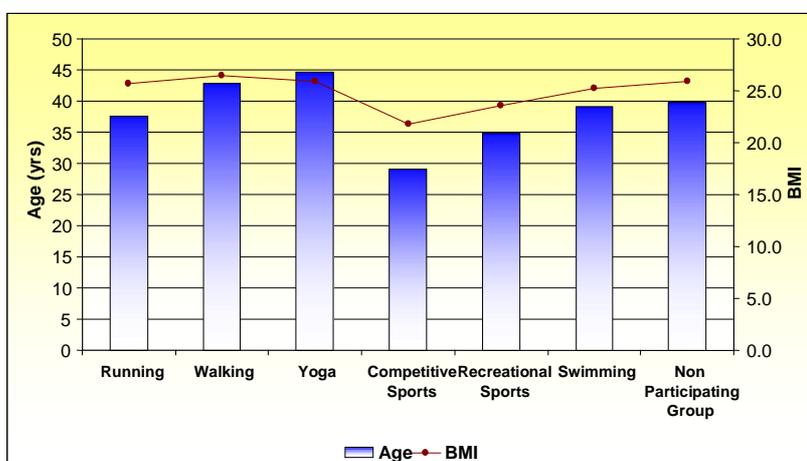
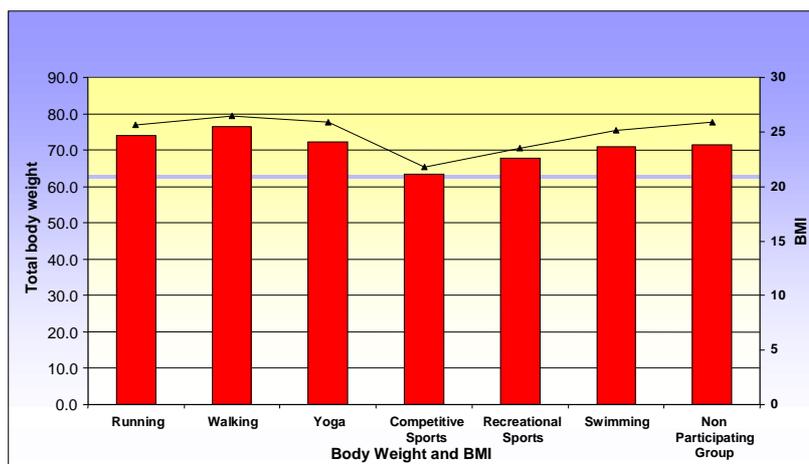


Table 2: Comparative assessment of the Flexibility (cm.) in male participants involved in various physical activities along with the group with no participation in any physical activity

Parameter	Physical Activity Groups	N	Mean	± SD	SE	Min.	Max.	F ratio	P
Flexibility	Running	20	5.6	± 5.6	1.2	0	20	9.738	< 0.05
	Walking	20	2.7	± 5.2	1.2	0	22		
	Yoga	20	8.4	± 6.	1.3	0	20		
	Competitive Sports	20	14.2	± 7.	1.6	2	24		
	Recreational Sports	20	8.3	± 6.7	1.5	0	20		
	Swimming	20	7.8	± 7.	1.6	0	21		
	Non Participating Group	20	1.7	± 3.7	0.8	0	15		
	Total	140	6.9	± 7.	0.6	0	24		

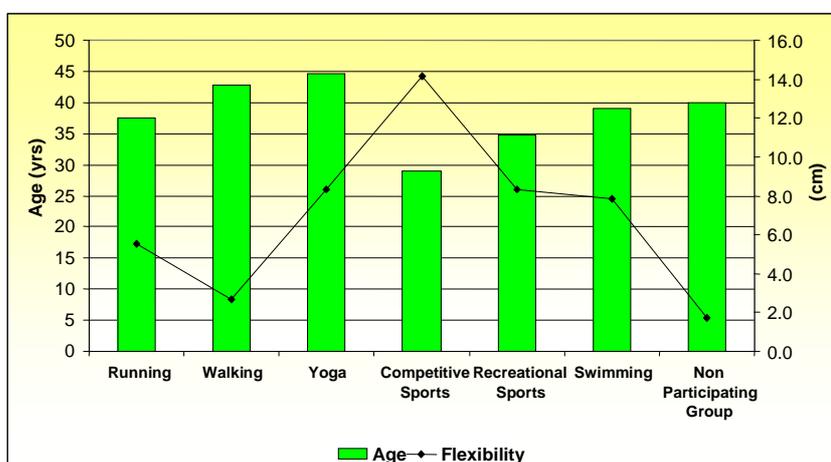
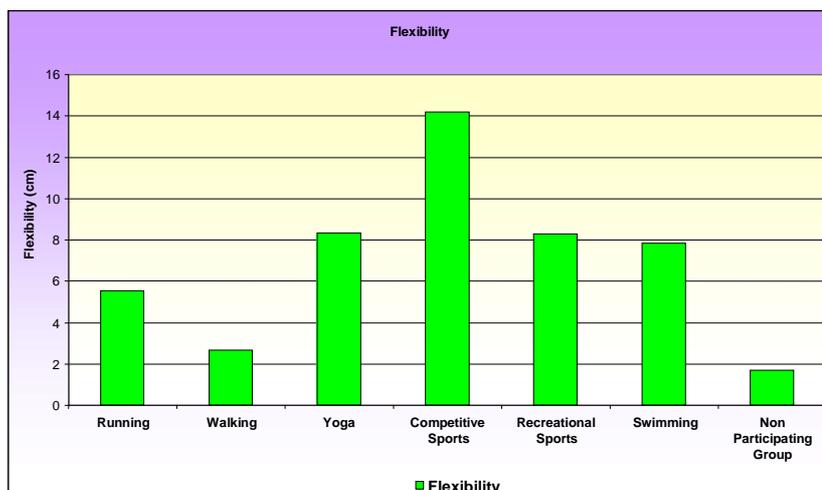
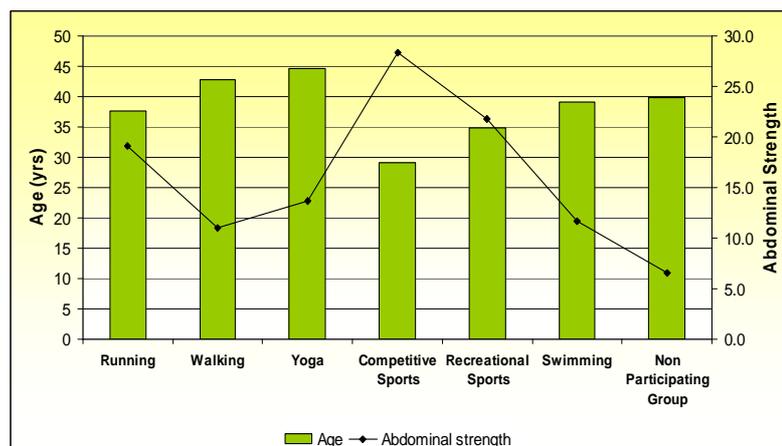
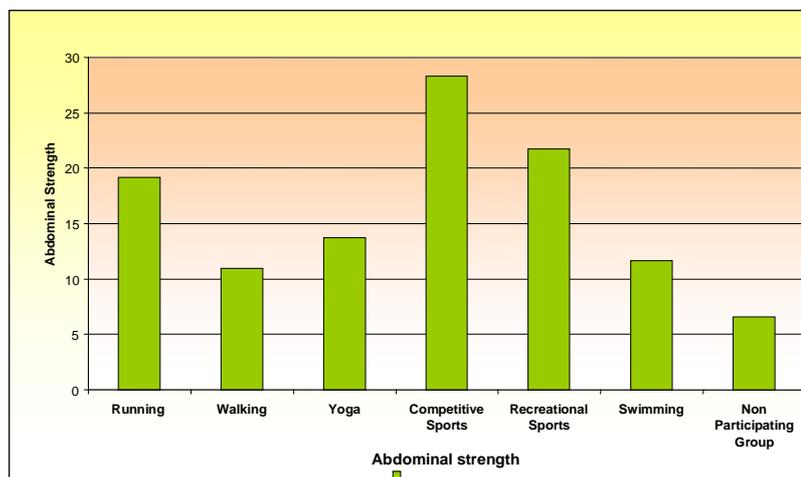


Table 3: Comparative assessment of the Abdominal Strength of male participants involved in various physical activities along with the group with no participation in any physical activity

Parameter	Physical Activity Groups	N	Mean	± SD	SE	Min.	Max.	F ratio	P
Abdominal Strength	Running	20	19.2	± 5.6	1.3	8	29	19.215	< 0.05
	Walking	20	11	± 9.2	2.1	0	27		
	Yoga	20	13.7	± 7.6	1.7	0	26		
	Competitive Sports	20	28.3	± 4.9	1.1	20	36		
	Recreational Sports	20	21.8	± 8.8	2	0	38		
	Swimming	20	11.7	± 8.1	1.8	0	28		

	Non Participating Group	20	6.6	$\pm 8.$	1.8	0	21		
	Total	140	16	1.2 $\pm$	0.9	0	38		



## DISCUSSION

### Body Mass Index

In the present study, a comparative assessment of Body Mass Index in male participants involved in different physical activities was carried out with one group representing the population with no regular physical activity. The results show the total variation of Body Mass Index between 17.1 and 34. Least mean Body Mass Index 21.8 was recorded for the participants engaged in the competitive sports activity followed with 23.5 those who are participating in Recreational sports. However, the walking group exhibited significantly (ANOVA,  $P < 0.05$ ) higher Body Weight than the other participants (Table 1). As BMI is the ratio of body weight and Height, less is the body weight less is the BMI. It is not a direct measure of body fatness and BMI is calculated from an individual's weight which includes both muscle and fat. As a result, some individuals may have a high BMI but not have a high percentage of body fat. In the present study,

since the body weight of the group engaged in walking activity was more, corresponding higher BMI was expected. As the group of people involved in competitive sports participates in high volume and high intensity variety of physical activities they have lean body weight with least BMI as compared to other group of people.

### **Flexibility**

In the present study, a comparative assessment of Flexibility in male participants involved in different physical activities was carried out. One group comprising individuals who do not participate in any physical activity was monitored along with other groups. The results show the total Flexibility between 0.0 and 24.0 cm. High Flexibility with mean of 14.2 cm was recorded from the participants engaged in the competitive sports activity followed by mean of 8.4 cm with those who practice Yoga regularly. The non participating group exhibited the mean value of 1.7 cm. It was found that none of the participant from the competitive sports group showed the zero flexibility. Significantly (ANOVA,  $P < 0.05$ ) low values were recorded for the participants belonging to the non participant group (Table 2). Flexibility is the ability to perform a joint action through a range of movement. Flexibility plays an important part in the ability of a person to perform a range of movements to allow technical development and assisting in the prevention of injury. Various techniques of stretching may be grouped as Static, Ballistic, Dynamic & Active. The better flexibility in physically active groups is an indication of its importance to the complete fitness for a person participating in physical activity program. People participating in competitive sports & yoga have to maintain the flexibility of their entire body which they achieve by practicing various stretching exercises and asanas. However, not all the physical activities show a similar or comparable result for the flexibility, thus indicating the role of different activities in imparting different levels of the flexibility in the participant.

### **Abdominal Strength**

In the present study, a comparative assessment of Abdominal Strength in male people involved in different physical activities was carried out. Also, a group comprising individuals who do not participate in any physical activity was monitored along with other groups. The results show the total variation of Abdominal Strength between 0.0 and 38.0. High Abdominal Strength with mean value of 28.3 was recorded from the participants engaged in the competitive sports activity followed with mean value of 21.8 those who practice recreational sports regularly. However, the non participant group exhibited significantly (ANOVA,  $P < 0.05$ ) lower Abdominal Strength than the physical activity groups (Table 3). For a sustainable physical activity regime, an individual has to maintain good abdominal strength as it is very essential for all the movements around the waist. For maintaining the abdominal strength they practice good number of sit ups.

### **CONCLUSION**

In the light of the results of study following conclusions are drawn:

1. Physical activities with moderate intensity and volume if practiced continuously at least 3-4 days in week are helpful in enhancing the health status of the people.
2. It is found from the data that age plays a vital role for people in selecting the nature of physical activity as a mean to maintain their health.
3. It is found from the evidences during the study that health of an individual is not affected by his height.

4. Competitive sport was the group with least Body Weight followed by the group participating in Recreational Sports, where Walking group exhibited maximum Body weight.
5. Competitive sport was the group with BMI followed by the group participating in Recreational Sports, where Walking group exhibited maximum BMI.
6. Competitive sport was the group with maximum abdominal strength followed by the group participating in Recreational Sports, where Non-Participating group exhibited minimum abdominal strength. Even people involved in Walking and Swimming also exhibited poor abdominal strength.
7. Competitive sport was the group with maximum flexibility of the hip joint and hamstring muscles followed by the group practicing Yoga, where as Non-Participating group exhibited minimum flexibility of the hip joint and hamstring muscles.
8. The study shows that the BMI, Abdominal strength and flexibility parameters of physical health of people depend upon variety of physical activities, intensity & volume.
9. People involved in competitive sports practice variety of fitness program with high intensity and volume to enhance their sports performance; and hence this group of people exhibited Least Body Mass Index, high flexibility & high abdominals strength.

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