

## A Study of Body Mass Index in Relation to Motor Fitness Components of School Going Children Involved in Physical Activities



### Physical Education

**KEYWORDS :** Body Mass Index, Motor fitness, Children

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#### ABSTRACT

*The purpose of study was to evaluate and compare the motor fitness in relation to Body Mass Index of school going children involved in physical activities.. One hundred school going male children of 9th and 10th grade were selected to serve as subjects for this study. The researcher divided the entire 100 sample into three groups. i.e. low BMI (N=25) , middle BMI (N=50) and High BMI (N=25) groups, which were compare with each other. All the subjects were tested on Chin ups, Vertical Jump, Shuttle Run, Sit and Reach and BMI (Body Mass Index). In order to find out the significance of differences between low BMI- high BMI, and middle BMI- high BMI of school going male children, means, standard deviations, quartile deviation (Q1 and Q3) and t-ratio were computed. The results of the study revealed that the significant difference was not found between Low BMI group- High BMI group in their vertical jump, flexibility, chin-ups components of motor fitness. Low BMI group children were more superior on muscular strength, speed, and agility and similar on flexibility compare to high BMI group children. Low BMI group was also superior on speed and agility components of motor fitness than middle BMI group children and was similar in other component of fitness. Where as, middle BMI group children were more superior on muscular strength, speed, and agility and similar on vertical jump and flexibility components of fitness in comparison of high BMI group children.*

#### INTRODUCTION

The term is most often used synonymously with physical fitness by the coaches but it is very important for the physical education students to understand the basic difference between physical fitness and motor fitness. Physical fitness is used to denote only the five basic fitness components (muscular strength, muscular endurance, cardiovascular endurance, freedom from obesity and flexibility), whereas motor fitness is more comprehensive team, which includes all the ten fitness components including additional five motor performances component (power, speed, agility, balance and reaction time), important mainly for success in sports. In other word, motor fitness refers to the efficiency of basic movements in addition to the physical fitness (Kansal, 1996) ..

Physical educators, exercise physiologists, and physicians have proposed many test to demonstrate the effect of such programs these tests have generally been labeled " motor fitness test" "physical fitness tests" and "cardiovascular tests" additional tests have been developed by state developments of physical education as well as many colleges and universities. With so many group and individuals promoting different fitness test, the practitioner may easily become confused especially when the same items appears or the both motor and physical fitness tests. Thus one might ask whether there is a difference between motor fitness and physical fitness. Are the dimensions of fitness equally relevant to all people of all ages? Are the specific importance and meaning of fitness taken into account when tests of motor and/or physical fitness are developed? Obviously, the nature of fitness- what it means to the participant the type of fitness activities selected the intensity and duration exercise- varies among school children, young adult, the middle-aged, and popular senior citizens. In other word fitnesses is specific to the needs of different populations. This is reflection in the perennial question. "Fitness for what?"

The importance of an optimal level of physical fitness as a reflection of certain aspects of health was demonstrated by the work of Kraus and Raab (1961) on hypo-kinetic diseases, or diseases directly related to a lack of exercise. These physicians identified low back pain, foot problems, abdominal posies, obesity, hypertension, and degenerative cardiovascular diseases as conditions produced by sedentary life-styles in our affluent, tension-producing society. Thus the concept of physical fitness does convey a meaning of healthful living that is partly reflection in the new health related fitness test described later in this chapter. Be-

cause heart disease, stroke and circulatory disorders are still primary causes of fitness is highly relevant for all people. Sedentary people suffer a higher incidence of coronary heart diseases than active persons (Morris et. al. 1973., paffenbarger & hale 1991). Thus attaining a desirable level of physical fitness is an important aspect of preventive medicine because physical inactivity appears to be related coronary heart disease. Recent longitudinal data shows that Harvard alumni who expend 2,000 calories a week in vigorous exercise during their life span will increase the quality of life as well as live one or more years longer than sedentary persons. For most young participants however a physical fitness test is one that attempts to measure the efficiency of both the muscular and cardiovascular systems.

Body Mass Index body mass index (BMI) is a ratio of total body weight to height. Several ratios have proposed, but one used most frequently. Weight (in kilograms) divided by height (in meters) square  $[WT/HT^2 (kg-m^{-2})]$ . This ratio is also known as the quilted index. Calculated BMI can then be compared against standard value to determine whether the individual has acceptable body weight, is overweight, or is obese The risk of excess mortality (depicted as a mortality ratio were 100 represents normal mortality) from increasing value for body mass index (BMI) is described by a j - shaped curve. BMI value is form 15-25 represent no excess mortality risk, and over 40 a high risk of excess mortality.(Brary, 1985)

The purpose of study was to evaluate and compare the motor fitness and Body Mass Index of school going children of D. P. S. public school" It was also hypothesized that the students with different Body Mass Index would show high level of motor fitness.

#### METHODOLOGY

##### Subjects:

One hundred school going male children of 9<sup>th</sup> and 10<sup>th</sup> grade and who volunteered to participate in this study, were selected to serve as subjects for this study. The subjects were in age group of 13 to 16 years. The entire subjects were selected from the 9th and 10th grade students of Delhi Public School, Bilaspur (CG) . The subject were also explained about the purpose of study in the presence of their school physical education teacher and principal to elicit active cooperation from the subject.

##### Sources of Data:

All the subjects were tested on Chin ups, Vertical Jump, Shuttle

Run, Sit and Reach and BMI (Body Mass Index) and scoring of data for each test was done as follows:

Number of correctly executed chin ups, maximum vertical height jumped from ground level and recorded in to nearest centimeter, time taken to run a distance of 60 meters as fast as possible recorded in 1/10 of second, slide the hands along with the measuring scale as far as possible without bouncing and to hold the rest position for at least one second and recorded in inch subtracted from the recorded reading to obtain the flexibility scores, height recorded in meter-centimeters and weight recorded in kilograms for BMI, were recorded for each of the as his score in each test subjects. For the purpose of making comparison between middle and high BMI on various components of motor fitness were directly used

**Collection of data:**

The data were collected by the sample to administer the entire test mention above according to rule lead down by the author. . The test was administered at Delhi public school, Bilaspur (CG) playground.

**RESULTS AND DISCUSSION**

To verify the hypotheses, Q1 and Q3 of BMI were calculated. Q1 score of BMI is 19.57, it means subject were having > 19.57 or 19.57 and < 24.56 or 24.56 for high BMI group and the subject whose BMI calculated between Q1 and Q3 were in middle BMI group.

The researcher divided the entire 100 sample into three groups that were low BMI group, middle BMI group and High BMI group. 25 subjects were found to low BMI group. 50 subjects to middle BMI group and 25 subjects to high BMI group, which were compare with each other.

In order to find out the significance of differences between middle BMI and high BMI of school going children belong to 9th and 10th grade(Boys), means, standard deviations, quartile deviation (Q1 and Q3) and t-ratio was computed. To check the obtained F-ratio and t-ratio, the level of significance was set at .05 level and data pertaining to this have been presented in Table 1 to 4

**TABELE 1**

**DESCRIPTIVE STATISTICS OF BODY MASS INDEX (BMI) ON VARIOUS COMPONENTS OF MOTOR FITNESS OF SCHOOL GOING MALE CHILDREN OF IX AND X GRADE**

Motor Fitness Components	Low BMI		Middle BMI		High BMI	
	SD	M	SD	M	SD	M
Vertical Jump	3.51	7.51	7.49	35.76	7.49	35.54
Chin ups	0.78	1.70	2.66	07.10	2.66	05.00
Shuttle Run	1.24	0.89	0.70	12.90	0.70	13.72
Sit and Reach	0.29	1.81	1.87	03.00	1.87	02.76

The mean scores of BMI i.e. low, middle, and high of performance of the subjects on various components of motor fitness of school going children ( Boys) of 9th and 10th grade have been presented.

**TABELE 2**  
**SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF MIDDLE AND HIGH BMI OF SCHOOL GOING MALE CHILDREN ON VARIOUS COMPONENT OF MOTOR FITNESS**

Motor Fitness Components	BMI	Mean	MD	σ DM	t-ratio
Vertical Jump	Middle High	35.76 35.54	0.22	0.024	0.11
Chin ups	Middle High	7.10 5.00	2.10	7.603	3.62*
Sit and Reach	Middle High	3.00 2.76	0.24	.125	0.54
Shuttle Run	Middle High	12.90 13.72	0.82	3.952	4.82*

Significant at .05 level

t.05(73)= 1.99

It is evident from table 2, that there was statistically significant difference between middle BMI – high BMI on chin ups and shuttle run components of motor fitness, as the obtained t-values of 3.62 and 4.82 respectively were higher than the required t-value of t.05 (73) =199.

**TABELE 3**  
**SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF LOW AND HIGH BMI OF SCHOOL GOING MALE CHILDREN ON VARIOUS COMPONENT OF MOTOR FITNESS**

Motor Fitness Components	BMI	Mean	MD	σ DM	t-ratio
Vertical Jump	Middle High	35.10 35.54	0.44	0.094	0.19
Chin ups	Middle High	7.88 5.00	2.88	17.51	6.08*
Sit and Reach	Middle High	2.96 2.76	0.20	.008	0.40
Shuttle Run	Middle High	12.44 13.72	1.28	7.43	5.81*

Significant at .05 level, t.05(48)= 2.01

It is evident from table 3, that there was statistically significant difference between low BMI – high BMI on chin ups and shuttle run components of motor fitness, as the obtained t-values of 6.08 and 5.81 respectively were higher than the required t-value of t.05 (48) =2.01.

**TABELE 4**

**SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF LOW AND MIDDLE BMI OF SCHOOL GOING MALE CHILDREN ON VARIOUS COMPONENT OF MOTOR FITNESS**

Motor Fitness Components	BMI	Mean	MD	σ DM	t-ratio
Vertical Jump	Middle High	35.10 35.76	0.66	0.231	0.35
Chin ups	Middle High	7.88 7.10	0.78	1.021	1.32
Sit and Reach	Middle High	2.96 3.00	0.04	0.003	0.08
Shuttle Run	Middle High	12.44 12.90	0.46	1.266	2.70*

Significant at .05 level, t.05(73)= 1.99

It is evident from table 4, that there was statistically significant difference between Low BMI - middle BMI on shuttle run component of motor fitness, as the obtained t-value of 2.70 was higher than the required t-value of t.05 (73) =199.

**DISCUSSION**

Findings of descriptive data of school going children belong to ixth and xth grade(Boys) of BMI ( low, middle and high ) on Vertical Jump, Chin ups, Sit and Reach, Shuttle Run components of motor fitness indicated that difference exists among different BMI children of school on various components of motor fitness and performance of the subjects on various components shows more improvement with middle BMI and less with Low

and high BMI.

When the male school going children were compared between Middle BMI – high BMI on together on various components of motor fitness, they had significant differences in their fitness components for the chin ups and shuttle run.

When the male school going children were compared between low BMI – high BMI on together on various components of motor fitness, they had also significant differences in their fitness components for the chin ups and shuttle run.

Furthermore, male school going children were compared between low BMI –middle BMI on together on various components of motor fitness, they had also significant differences in their fitness component for the shuttle run only.

It was also hypothesized that “The students with Less Body Mass Index would show high level of motor fitness” is partially accepted, as male school going children were high on chin ups in comparison with middle and high BMI. Middle Body Mass Index students showed high level of motor fitness on vertical jump and sit and reach chin ups in comparison with low and high BMI. male school going children. Where as, students with high Body Mass Index showed high level of motor fitness high only on chin ups in comparison with low and high BMI male school going children.

#### CONCLUSIONS

1. Middle BMI group and high BMI group were equal on explosive leg strength.
2. Middle BMI group having more muscular strength compare to high BMI group.
3. Middle BMI group and high BMI group having equal flexibility.
4. Middle BMI group are having more speed and agility compare to high BMI group.
5. There was no significant of difference on vertical jump between low BMI group and high BMI group.
6. High BMI group having low muscular strength compare to low BMI group.
7. There was no difference on flexibility between low and high BMI group.
8. Low BMI group having more speed and agility compare to high BMI group.
9. Low BMI group and middle BMI group are equal on vertical jump.
10. There was no difference on chin up between low and high BMI group.
11. On flexibility component, low BMI group and high BMI group are equal.
12. Low BMI group are superior on speed agility compare to middle BMI group.

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