



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2018; 3(1): 582-586

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www.theyogicjournal.com

Received: 22-11-2017

Accepted: 23-12-2017

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A comparative study of physical fitness component of school boys

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Abstract

The purpose of this study was to compare the Physical Fitness different age groups boys. The present study was conducted on the 2000 School Boys, 500 subjects from each group. Their age was ranged 13 to 16 year. In the selection of the subject's random sampling technique was employed. The AAHPER Youth Fitness (1976) test was selected for the purpose of this study. The result of the study concluded that there was statistically significant difference in age groups. There were significant difference obtained on pull-up, sit-up and shuttle run among various groups (13 years to 16 years) boys. When the paired mean differences existed between pull-ups variable was 13 years -16 years, sit-up variable was 13-16 years, shuttle-run variable was 13 years -16, standing broad jump variables was 13-16 years, 50 yard dash variables was 13 -16 years, 600 yard run/ walk variables was 13-16 years used. the results indicate that there has been a significant difference among various age groups of school boys as the obtained F value of all the component. Significant of data required to be significant at 0.05 level.

Keywords: Physical Fitness, AAHPER, sampling, technique, difference, pull-up, etc.

Introduction

It is self-evident that the fit citizens are a nation's best assets and weak ones its liabilities. It is therefore the responsibility of every country to promote physical fitness of its citizens because physical fitness is the basic requirement for most of the tasks to be undertaken by an individual in his daily life. If a person's body is under-developed or grows soft or inactive and if he fails to develop physical prowess, he is undermining his capacity for thought and for work, which are of vital importance to one's own life and society in a welfare state.

Physical fitness is the capacity to carry out reasonably well various forms of physical activities without being unduly tired and includes qualities important to the individual's health and well being. Regular participation in vigorous exercise increases physical fitness. A high level of physical fitness is desirable for a full, productive life. Sedentary living habits and poor physical fitness have a negative impact on both health and daily living.

Numerous scientific studies have documented the beneficial effects of exercise in groups of men and women across the entire range of adult age. Research has also shown that exercise patterns and fitness levels established during childhood and adolescence are likely to carry over throughout entire adult life. Sound exercise habits developed in these early years provide the foundation for a lifetime of physical fitness through exercise.

Physical fitness is the ability of your body systems to work together efficiently to allow you to be healthy and effectively perform activities of daily living. Being efficient means being able to do daily activities with the last amount of effort. A fit person is able to perform schoolwork as well as responsibilities at home and still have enough energy and vigor to enjoy school sports and other leisure activities. A fit person has the ability to respond to normal life situations a part time job or marching in the band at school. A fit person also has the ability to respond to emergency situations such as running to get help or aiding a friend in distress.

Components of Physical Fitness

There are five physical fitness components. These are directly or indirectly inter-related. Each component has its own importance in different games and sports. These are (1) Strength (2) Speed (3) Endurance (4) Co-ordination / Agility

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1. Strength: It is ability to overcome resistance. Strength can be defined as the amount of force a muscle can exert. It is the most essential component for games and sports or to do any work in daily life. It level differs from game to game and sex to sex and individual to individual. It is of two types: (a) Static (b) Dynamic can further be divided into three parts: (i) Maximal Strength (ii) Explosive Strength (iii) Strength Endurance

- a) **Static Strength:** static strength is also called isometric strength. It is the ability of muscles to act against resistance. Static can be measured by dynamometer.
- b) **Dynamic:** It is also known as isotonic strength. It is related to movement. Thus we can say that it is required for movement. it is of three types:
 - i) **Maximal Strength:** it is the ability to overcome or to act against maximal resistance. Just like it is required in weight-lifting, power-lifting, wrestling and throwing events etc.
 - ii) **Explosive Strength:** A combination of strength and speed abilities. In the other words, it can be defined as the ability to overcome resistance with high speed. Explosive strength can further be divided into strength, strength speed (power) and speed strength. Start strength- It is ability to develop maximal muscle force during the starting phase of the movement sprints start, weight lifting etc. Strength speed is the ability to overcome heavy resistances with high speed e.g., throws, jumps etc. Speed strength is the ability to overcome lower resistance with high speed e.g., team games, combat sports (lower weight categories) the explosive strength of different nature in cycling and cycling movements e.g. (power).
 - iii) **Strength Endurance:** it is the combination of strength and endurance ability. It is defined as ability to overcome resistance under fatigue condition. Strength endurance can be a form static or dynamic strength depending on the fact whether the movement is static (isometric) dynamic (isotonic). It is commonly required for long distance races, swimming and road cycling etc.

2. Speed: It is the ability to perform movements/actions at faster rate. In the words, it is the ability to move the body as fast as possible. Speed is basically dependent on heredity but can be improved through proper training. It depends upon the white muscle fibers (fast twitch). It is one of the important components for sprinting as well as for fast responses in skill. It is five types:

- a) **Reaction time:** It is the ability to react efficiently and quickly to a signal. It is the time taken for response/change/react after the stimulus or it the time taken to react for certain movement, or it is the ability to do a movement by a person after a signal.
- b) **Speed of Movement:** It is the fastness or quickness of complete action/movement or it is the ability to do a single movement in minimum time. Theiss and Schnabel has defined speed” It is the performance prerequisite to do motor actions under given conditions movements, task, external factors, individual prerequisites in minimum of time” speed can be measurement through reflex test, short sprints etc.
- c) **Acceleration Ability:** It is the ability to achieve high speed of location from a stationary position or from a slow moving position. Acceleration ability depends on a great extent on explosive strength, technique and movement frequency.
- d) **Speed Endurance:** it is the ability to do sports

movements with high under conditions of fatigue. Speed endurance is a combination of speed and endurance abilities.

- e) **Locomotor Ability:** It is the ability to maintain maximum speed of locomotion for maximum possible duration or distance. Locomotor ability is important in only a few sports or events i.e. 100m and 200 m sprints races, short- sprints in track cycling and speed skating. Locomotor ability depends on a great extent on mobility of the nervous system which allows for high speed movements.

3. Endurance: It is the ability to sustain or continue activity. In the words, it is the ability to resist fatigue. “Endurance is the ability to do sports movement, with the desired quality and speed, under conditions of fatigue.” It is one of the important components for middle and long distance races, and also required for major games, like football, hockey, basketball and hand-ball etc. It can be through distance run or time factor races. It is of four types:

- a) **Speed Endurance:** This ability is required for cyclic activities lasting upto 45 seconds. The 100m, 200m and 400m sprints in track are classical examples of speed endurance. A very high amount of oxygen debt is recorded in speed endurance activities.
- b) **Short Term/ Anaerobic endurance:** This endurance ability is needed for cyclic activity lasting from about 45 seconds to two minutes. The 800 m run/race is a typical example of short time endurance. In short time endurance activities the energy is produced by a combination of glycolysis and oxidation. Short term endurance depends on a significant extent on speed endurance and strength endurance.
- c) **Medium term endurance:** This ability is required for cyclic activities lasting from 2 to 11 minutes. Typical examples of cyclic activities requiring medium time endurance are 1500m and 3000 m in track and 100m in rowing. The energy production for activities of this duration is second are activities in which combination of glycolysis and oxidation is nearly equal. Due to involvement of glycolysis in medium time endurance activities, lasting up to eleven minutes, high concentration of lactic acid is produced.
- d) **Long term/Aerobic Endurance:** The long term endurance is needed for cyclic activities lasting more than eleven minutes. The energy production is achieved mainly from oxidation of glycogen. For activities lasting 30 minutes or more time significant amount of energy production is achieved through glycolysis. In other words, this type of activity is of aerobic nature and speed is slow. It is also known as cardiovascular endurance. It is required for long distance races, road races like cross country, marathon race and road cycling etc. for activities lasting more than 30 minutes, the energy production by oxidation of fatty acids (fat metabolism) increases steadily with the increase in the duration activity.

4. Flexibility: It is ability of joint to move in maximum range. In the other words, flexibility is the ability to execute movements with greater amplitude or range. Commonly flexibility is known as stretch ability, elasticity, suppleness, mobility etc. flexibility varies from joint to joint due to its structure, surrounding or adjoining ligaments, tendons and muscles. It is measured through flexometer. It is of two types:

- a) **Passive Flexibility:** It is ability of joint to move to its maximum range with external help, e.g. stretching exercises with partner.
- b) **Active flexibility:** It is performed without external help or self-movement of a part to maximum range e.g. stretching a joint by a sportsman himself without any external help.

5. Co-ordination/ Agility: It is the ability of the body to perform movement with perfection and efficiency. It is in fact proper combination of strength, speed, endurance and flexibility during movement, efficiently and perfection in movement is due to coordination ability, it may be any activity or sports.

Procedure and Methodology

In the present study a sample of 2000 boys ranging between 13 to 16 years studying. The AAHPER Youth Fitness (1976) test was selected for the purpose of this study, because the test

has been frequently used in the existing literature. 1. Pull-up, 2. Sit-up, 3. Shuttle-run, 4. Standing broad jump, 5. 50 yard dash, 6. 600 yard run/walk. For the analysis of data, collected by administering to the entire subject’s random sampling, mean differences and F- value between age groups.

Results

To the above analysis it revealed that there were significant difference obtained on pull-up, sit-up and shuttle run among various age groups (13 years to 16 years) of boys. When the paired mean difference on pull-up, sit-up and shuttle-run were found that significant differences existed between 13 years & 16 years boys. There were significant difference obtained on standing broad jump and 50 yard dash among significant differences were obtained between 13 years and 16 years. There were significant differences obtained on 600 yard run/walk among different age groups of boys. Further significant differences were obtained F-value between 13 years and 16 years.

Table 1: Analysis of Variance of School Boys on Pull-up(13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
Pull -up	Between Group	4927.094	3	16.42.365	264.992*
	Within Group	12370.794	1996	6.198	
	Total	17297.888	1999		

*Significant at.05 level
F.05(3, 1996) = 2.60

The above results that there has been a significant difference among various age groups of school boys as a obtained F

value (264.99) was found be greater than the table value of 2.60, which is required to be significant at 5% level.

Table 2: Analysis of Variance of School Boys on sit-up (13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
Sit -Up	Between Group	884.966	3	2948.989	157.881**
	Within Group	37282.334	1996	18.679	
	Total	46129.300	1999		

*Significant at.05 level
F.05(3, 1996) = 2.60
F.05(3, 1996) = 2.60

From result entered in table 2 indicates that there has been a significant difference among the various age-groups of school

boys in the score of their sit-up variable as the obtained F-value (157-88) was significant at.05 level.

Table 3: Analysis OF Variance OF School Boys on Shuttle-Run (13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
Shuttle-Run	Between Group	180.863	3	60.288	147.730**
	Within Group	814.558	1996	.408	
	Total	995.422	1999		

*Significant at.05 level
F.05(3, 1996) = 2.60
F.05(3, 1996) = 2.60

The result presented in table 3 revealed that there has been significant difference between 13 to 16 years age groups of school boy’s variable of the subjects. The obtained F value in

shuttle run variable was 147.73 F- values were greater than the table value of 2.60, which is required to be significant, was at 5% level. The variable was significant.

Table 4: Analysis Of Variance of School Boys on Standing Broad Jump (13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
Standing Broad Jump	Between Group	13.285	3	4.428	127.48**
	Within Group	69.337	1996	.35	
	Total	82.623	1999		

*Significant at.05 level
F.05(3, 1996) = 2.60
F.05(3, 1996) = 2.60

The result presented in table 4 revealed that there has been significant difference between 13 to 16 age groups age of school boy's variable of the subject. The obtained F value in

standing broad jump (SBJ) variable was 127.48. F value was greater than the table value of 2.6, which is required to be significant at 5% level. The variable was significant.

Table 5: Analysis of Variance of School Boys on 50 Yard Dash (13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
50 Yard Dash	Between Group	106.886	3	35.629	68.237**
	Within Group	1042.179	1996	.522	
	Total	1149.065	1999		

*Significant at.05 level

F.05(3, 1996) = 2.60

F.05(3, 1996) = 2.60

The result presented in table 5 revealed that there has been significant difference between 13 to 16 age groups age of school boy's variable of the subject. The obtained F value in

50 yard dash variable was 68.24. F value was greater than the table value of 2.60, which is required to be significant at 5% level. The variable was significant.

Table 6: Analysis of Variance of School Boys on 600 Yard Run/Walk (13-16 Years Age-Groups)

Variable	Source of Variance	Sum of Squares	DF	Mean Square	F-value
600 Yard Run/Walk	Between Group	2872.390	3	957.463	13.826**
	Within Group	138229.770	1996	69.253	
	Total	141102.160	1999		

*Significant at.05 level

F.05(3, 1996) = 2.60

F.05(3, 1996) = 2.60

The result presented in table 6 revealed that there has been significant difference between 13 to 16 age groups age of school boy's variable of the subject. The obtained F value in 600 yard run/walk variable was 13.83. F value was greater than the table value of 2.60, which is required to be significant at 5% level. The variable was significant.

standing 50 yard dash among different age groups of school boys. 13 years & 14 years, 13 years & 15 years, and 13 years & 16 years, 14 & 15 years and 14 years & 16 years. There was significant difference obtained on standing 600 yard run/walk among different age groups of school boys. 13 years & 14 years, 13 years & 15 years, and 13 years & 16 years, and 14 years & 16 years.

Discussion and Conclusions

The results of the study are concluded as follows:

To the above analysis it revealed that there were significant difference obtained on pull-up, sit-up and shuttle run among various age groups (13 years to 16 years) of boys. The calculated F values in case school boys on pull-up as the obtained was 264.99(P<0.05, F-value being 2.60).

The calculated F values in case school boys on sit-up as the obtained was 157.88(P<0.05, F-value being 2.60). The calculated F values in case school boys on Shuttle run as the obtained was 147.73(P<0.05, F-value being 2.60). The calculated F values in case school boys on standing broad jump as the obtained was 127.48(P<0.05, F-value being 2.60).

The calculated F values in case school boys on 50 yard dash as the obtained was 68.24(P<0.05, F-value being 2.60). The calculated F values in case school boys on 600 run/walk as the obtained was 69.25(P<0.05, F-value being 2.60). There was significant difference obtained on pull-up, among age groups (13 to 16 years) of school boys. There was significant difference obtained on sit-up among different age groups of school boys. There was significant difference obtained on sit-up among different age groups of school boys. Further significant were obtained between 13 years & 16 years, 14 years 16 years, and 15 years 16 years. There was significant difference obtained on shuttle -run among different age groups of school boys 13 years & 14 years, 13 years 15 years, and 13 years & 16 years, 14 & 15 years, 15 years & 16 years.

There was significant difference obtained on standing broad jump among different age groups of school boys. 13 years & 15 years, 13 years & 16 years, and 14 years & 15 years, 14 & 16 years. There was significant difference obtained on

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