

## Analysis of Health Related Physical Fitness Components in Female Students of Government and Private Schools of Chandigarh

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### Abstract

**Purpose:** Health related physical fitness consists of those components of physical fitness that have a relationship with good health. This research aimed at comparing the health related physical fitness between government and private school girls of Chandigarh.

**Material and Methods:** To do so a descriptive survey was designed. A total of three hundred (N=300) girls, (150) from government schools and 150 from private schools of Chandigarh, aged between 16 - 18 years, were selected through purposive sampling technique. To measure maximal functional capacity and cardio-respiratory fitness, the level of obesity, the abdominal muscular strength & endurance, and the flexibility of the lower back and posterior thighs of the participants, the 9-Minute run, Skin fold Caliper, modified sit-ups and Sit and reach tests were applied, respectively. Student T-test was applied to compare the two study groups.

**Results:** Results showed that private school girls had better health related physical fitness as compared to government school girls.

**Discussion and Conclusion:** So the formers need to be provided with better physical facilities, nutritional diet and other related things which help them in improving their health relate physical fitness.

**Keywords:** Cardio-respiratory function, Body composition, Flexibility, Muscular endurance, Government, private school, Chandigarh

### Introduction

Physical fitness can be thought of as an integrated measure of most, if not all, the body functions involved in the performance of daily physical activity and/or physical exercise [1]. Included in this definition are characteristics such as cardio-respiratory endurance, muscular strength and endurance, body composition and flexibility [2]. These characteristics are often referred to as 'health-related components' [3] and are usually associated with disease prevention and health promotion. Childhood and adolescence are important stages of life, since remarkable physiological and psychological changes take place at these ages. Similarly, lifestyles and healthy/unhealthy behaviors are formed during these years, which may influence adult behavior

and health status. Low physical fitness in children has been associated with impaired health indicators such as increased body fatness [4] and abdominal adiposity [5], several cardiovascular disease risk factors [6], hypertension [7,8] and low physical activity [4]. Therefore, it is important to promote high levels of fitness in modern youth. A number of recent studies have drawn attention to increases in fatness [9] and declines in aerobic fitness [10] in school age children.

Physical fitness is recognized as an important component of health [11,12] and it may be important for the performance of functional activities and quality of life [13,18]. Low physical fitness may result in high physical strain during the performance of activities [15]. As a consequence, activity levels may decrease due to fatigue and discomfort, exacerbating low physical fitness. Caspersen et al. defined several health-related components of physical fitness, (i.e. aerobic capacity, muscle strength and endurance, flexibility

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and body composition) [5].

Physical fitness is one of the basic requirements of life. Broadly speaking, it is the ability to carry out daily tasks without undue fatigue. In the sporting context, it is difficult to be defined since it can refer to psychological, physiological or anatomical state of the body. Most physical education teachers see it as a concept obtained by measuring and evaluating a person's state of fitness by using a variety of tests. The concept of physical fitness, in general athletic terms, means the capability of the individual to meet the varied physical and physiological demands made by a sporting activity, without reducing the person to an excessively fatigued state. Such a state would be one in which he/she can no longer perform the skills of the activity accurately and successfully. This is where the theoretical ideas involved in the discussion on the system that provide the energy necessary for human exercise become directly related to day-to-day sporting activities. That is to say we should use our knowledge of the scientific basis of exercise to improve our sport performance in a systematic and predictable way. Physical fitness is based on physiological capacity of the body. In the world of sports, every participating individual and spectator generally, eye to the positioned athletes and they also become in the main lime-light in the field of sports.

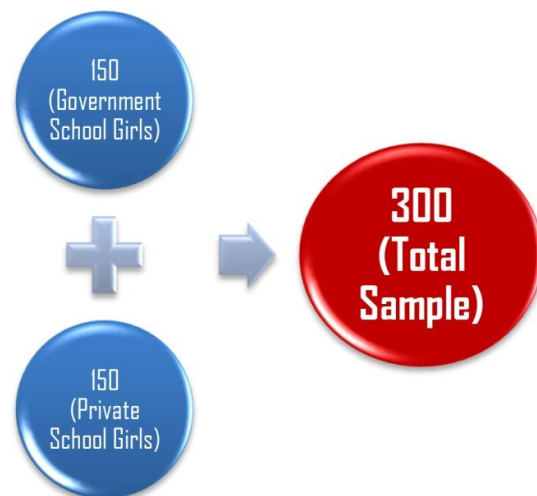
Health related physical fitness consists of those components of physical fitness that have a relationship with good health. The components are commonly defined as body composition, cardiovascular fitness, flexibility, and muscular strength endurance. However, the development of each component varies with the type of the individual's specific physical activity. On the other hand, health-related physical fitness is defined as the ability to perform strenuous activity without excessive fatigue, or showing evidence of traits that limit the risks of developing diseases and disorders which affect a person's functional capacity. Health and physical fitness are important to everyone and should be stressed by physical educators and medical professionals alike [16].

Health-related fitness refers to the state of physical and physiological characteristics that define the risk levels for the premature development of diseases or morbid conditions presenting a relationship with a sedentary mode of life [16]. Important determinants of health related

fitness include factors such as body mass for height, body composition, subcutaneous fat distribution, abdominal visceral fat, bone density, strength and endurance of the abdominal and dorso-lumbar musculature, heart and lung functions, blood pressure, maximal aerobic power and tolerance to sub maximal exercise, glucose and insulin metabolism, blood lipid and lipoprotein profile, and the ratio of lipid to carbohydrate oxidized in a variety of situations. Therefore, the present study was conducted to compare the cardio-respiratory function, body composition, abdominal muscular strength & endurance and flexibility of female students of government and private school of Chandigarh

### Material and Methods

To compare health related physical fitness between government and private school girls of Chandigarh, a descriptive survey was designed. Three hundred girls (N=300), 150 from government schools and 150 from private schools of Chandigarh), aged between 16 to 18 years, who studied in grades 11 and 12 were selected to take part in this study through purposive sampling.



**Figure1:** The break-up of total sample

### The study variables

The following variables were selected for the present study:

- 1- Cardio-respiratory function
- 2- Flexibility
- 3- Body composition
- 4- Muscular strength and endurance

## Measurement tools

### *Health Related Physical Fitness Tests [1].*

#### 1) *The 9-Minute run*

**Purpose:** The purpose of the distance runs was to measure maximal functional capacity and endurance of the cardio-respiratory system.

**Test Description:** Students were instructed to run as far as possible in nine minutes. The students began on hearing the whistle and continued to run until another whistle indicated the end of the nine minutes. Walking was also permitted.

**Scoring:** The nearest 10 meters was recorded as the participant's score.

#### 2) *Sit and Reach Test*

**Purpose:** The purpose of this test was to evaluate the flexibility of the lower back and posterior thighs.

**Equipments:** a 12x 12-inch box made of ¾ inches play wood, with a scale marked on the top of the box overall was used.

**Test description:** While assuming their starting position, students removed their shoes and sat down at the apparatus with their knees fully extended and their feet shoulder-width apart and kept flat against the end board.

The arms were extended forward with the two hands placed on the top of one other to perform the test. The students reached directly forward, palms down, along the measuring scale four times and held the position of maximum reach for one second.

**Scoring:** The score was the most distant point reached on the fourth trial measured to the nearest centimeter. The test administrator remained close to the scale and noted the most distant line touched by the fingertips of both hands. If the hands reached unevenly, the test was re-administrated. The tester placed one hand on the subject's knees to ensure that they remain extended.

#### 3) *Sum of Skin fold Fat*

**Purpose:** The purpose was to evaluate the participants' level of fatness **Equipments:** Skinfold fat calliper.

**Test Description:** The Skinfold fat measure consisted of a double layer of subcutaneous fat and skin the thickness of which may be measured with a skinfold fat caliper. Two skinfold fat sites (triceps and subscapular) have been chosen for this test because they are highly correlated with total body fat.

**Scoring:** Each measurement was repeated three consecutive times and the mean of the three was recorded as the participant's score. Each reading was recorded to the nearest 0.5mm.

#### 4) *Modified Sit-Ups*

**Purpose:** The purpose of the sit-ups was to evaluate abdominal muscular strength and endurance.

**Equipments:** Mat or other comfortable surfaces, a stop watch, wrist watch or clock for timing.

**Test Description:** To assume the starting position, the student lied on her back with the knees flexed, feet on floor, with the heels, between 12 and 18 inches from the buttocks. The arms were crossed on the chest with the hands on the opposite shoulders. The feet are held by a partner to keep them in touch with testing surface. By tightening her abdominal muscles the student curled up to the sitting position. Arm contract with the chest was maintained. The chin remained tucked on chest. The sit-up was completed when the elbows touch the thighs. To complete the sit-up the student returned to the down position until the mid back touched the testing surface.

**Scoring:** The number of correctly executed sit-ups performed in 60 seconds was recorded as the student's score.

### *Statistical Analyses*

Independent T-test was applied to compare health related physical fitness of the government and private school girls of Chandigarh. The statistical analysis was done with the help of Medical Calculation software (Version 12.01). The level of significance was set at 0.05.

### **Results**

Table-1 depicts the results of comparing cardio-respiratory function of between government and private school girls of Chandigarh. The 't'-value 1.58 as shown in the table above was found to be insignificant. It has been seen from above results that private school girls had better cardio-respiratory function level as compared to government school girls. The comparison of mean scores of both groups has been presented in Figure-2.

Table-2 shows the results of comparing the flexibility of government and private school girls. The 't'-value 1.64 as shown in the table above was found to be insignificant. (P= 0.10 ). It has been

seen from the above results that private school girls had better flexibility of the lower back and posterior thighs as compared to the than government school girls.. The mean scores of the two study groups have been presented graphically in Figure-3.

Table-3 presents the results of comparing the body composition of government and private schools girls. The 't'-value 2.73 as shown in the table above was found to be significant (P= 0.00) It has been seen from the above results that government school girls had lower body fat levels as compared to private school girls . The

comparison between the mean scores of the two study groups has been presented graphically in Figure-4.

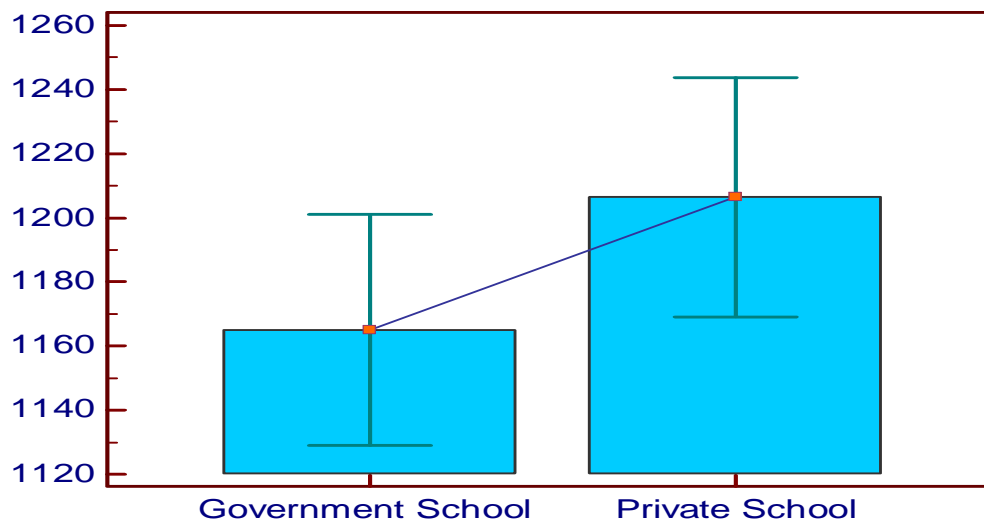
Table-4 shows the results of the abdominal muscular strength and endurance in government and private school girls. The 't'-value 5.04 as shown in the table above was found to be significant (P= 0.00) It can be seen from the above results that private school girls had better abdominal muscular strength and endurance level as compared to government school girls . Mean scores of the two study groups have been presented graphically in Figure-5.

**Table 1:** Cardio-respiratory Function of the two study groups

Sample size	Government School	Private School
	150	150
Arithmetic mean	1164.90	1206.47
95% CI for the mean	1128.89 to 1200.92	1169.20 to 1243.73
Variance	49830.30	53346.23
Standard deviation	223.22	230.96
Standard error of the mean	18.22	18.85
Difference		41.56
95% CI of difference		10.04 to 93.17
Test statistic t		1.58
Degrees of Freedom (DF)		298

P=0.11

\*Significant at 0.05 level



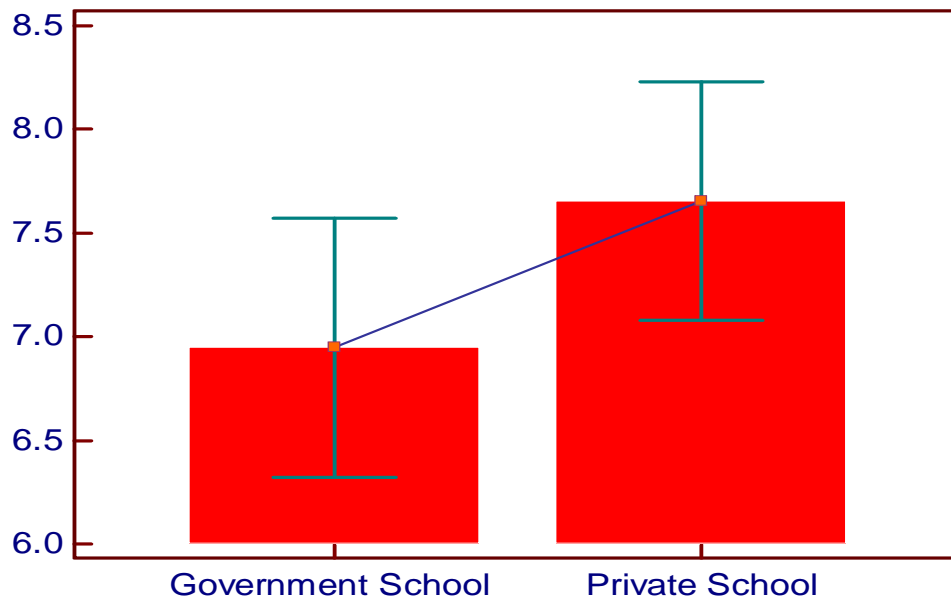
**Figure 2:** Cardio-Respiratory Function of the two study groups

**Table 2:** Flexibility of the two study groups

Sample size	Government School	Private School
	150	150
Arithmetic mean	6.94	7.65
95% CI for the mean	6.32 to 7.57	7.07 to 8.22
Variance	15.04	12.75
Standard deviation	3.87	3.57
Standard error of the mean	0.31	0.29
Difference		0.706
95% CI of difference		0.14 to 1.55
Test statistic t		1.64
Degrees of Freedom (DF)		298

**P=0.10**

\*Significant at 0.05 level



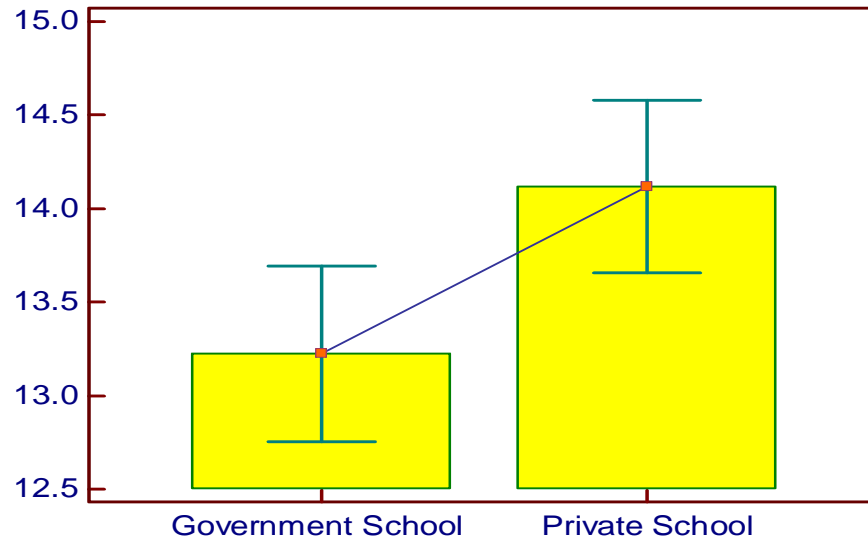
**Figure 3:** mean scores of Flexibility in the two study groups

**Table 3:** Body Composition of the two study groups(MM)

Sample size	Government School	Private School
	150	150
Arithmetic mean	13.21	14.11
95% CI for the mean	12.74 to 13.67	13.65 to 14.57
Variance	8.27	8.17
Standard deviation	2.87	2.85
Standard error of the mean	0.23	0.23
Difference		0.904
95% CI of difference		0.25 to 1.55
Test statistic t		2.73*
Degrees of Freedom (DF)		298

**P = 0.00**

\*Significant at 0.05 level



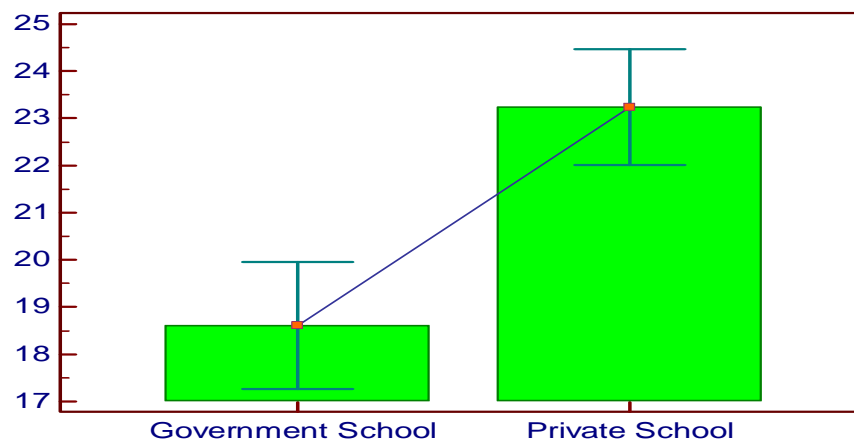
**Figure 4:** mean scores of Body Composition in the two study groups

**Table 4:** Abdominal Muscular Strength and Endurance of the two study groups

	Government School	Private School
<b>Sample size</b>	<b>150</b>	<b>150</b>
<b>Arithmetic mean</b>	<b>18.60</b>	<b>23.24</b>
<b>95% CI for the mean</b>	<b>17.26 to 19.95</b>	<b>22.0193 to 24.46</b>
<b>Variance</b>	<b>69.34</b>	<b>57.24</b>
<b>Standard deviation</b>	<b>8.32</b>	<b>7.56</b>
<b>Standard error of the mean</b>	<b>0.67</b>	<b>0.61</b>
<b>Difference</b>		<b>4.63</b>
<b>95% CI of difference</b>		<b>2.82 to 6.44</b>
<b>Test statistic t</b>		<b>5.04</b>
<b>Degrees of Freedom (DF)</b>		<b>298</b>

**P = 0.00**

\*Significant at 0.05 level



**Figure-5:** mean scores of Abdominal Muscular Strength and Endurance of the two study groups

## Discussion and Conclusion

Results from the present study showed insignificant differences between government and private school girls of Chandigarh in cardio-respiratory function. But on calculating the mean values of the two groups, it has been found that private school girls outperformed the government school students in maximal functional capacity and endurance of the cardio-respiratory system. High and moderate levels of aerobic endurance, flexibility, muscular strength/endurance, and desirable body fat levels, are very important for promoting health at all ages, and to avoid early development of chronic diseases [17]. The 9th class students demonstrated significantly better maximal functional capacity and endurance of the cardio-respiratory system as compared to their 8th class counterparts, whereas 10th class students were significantly better in maximal functional capacity & endurance of cardio-respiratory system as compared to 8th and 9<sup>th</sup> classes [18].

According to the results, flexibility of the government and private school girls had insignificant differences. But a closer look at this component showed that private school girls had better flexibility levels as compared to their counterpart government school girls. The students from Kendriya Vidyalaya and Shree Ji Baba Saraswati Vidhya Mandir, Mathura did not show any statistically significant differences in health related physical fitness components, namely Endurance, Agility, Flexibility, Body Composition, Abdominal strength, and Shoulder strength [19].

Results of body composition study revealed significant differences between government and private schools girls. After evaluating the mean values of both groups, it was noticed that government school girls had better body compositions as compared to private school girls. Class 8 students demonstrated better body compositions as compared to classes 9 and 10. Similarly class 9<sup>th</sup> students demonstrated better results in the mentioned factor as compared to 10th class students, however this difference was not significant. While examining weight status, a study regarding the health related physical fitness and quality of life in Hong Kong adolescents revealed that both overweight and underweight adolescents had lower health related physical fitness levels as compared to those with normal weight [20].

The results regarding abdominal muscular

strength and endurance showed significant differences between government and private school girls with the private school girls exhibiting better abdominal muscular strength and endurance as compared to their counterpart government school girls. The Kandi area boys, aged between 15-16 years (10th class students) demonstrated better abdominal muscular strength & endurance as compared to Non-Kandi area boys of the same age but the difference was not significant. 9th class students exhibited significantly better abdominal muscular strength & endurance, compared to 8th class students. Similarly 10th class girls significantly outperformed 8th and 9th class students in the mentioned factor. 9th class students showed significantly better flexibility of the lower back and posterior thighs as compared to 8th class students. Similarly 10th class students demonstrated significantly better flexibility as compared to 8th and 9<sup>th</sup> class students [18].

According to the results, no significant differences were found between government and private school girls of Chandigarh in flexibility and cardio-respiratory function. However significant differences were observed between the two study groups regarding their body composition and abdominal muscular strength and endurance.

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