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Cross-sectional comparisons of Physical fitness between the girls of government and private schools

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Abstract
The purpose of the study was to assess the differences of physical fitness between girls of private and government schools of Amritsar district of Punjab. The sample included 381 purposively selected girls of various private and government schools. The tests were taken on some selected variables viz. speed, agility, coordination, balance, reaction time, handgrip strength, endurance, explosive power, flexibility, % body fat. The data was analyzed using Student's independent t-test. The study found that government school girls performed better on the variable reaction time, handgrip strength and endurance whereas private school girls showed less % body fat than their counterparts. Meanwhile, no differences were seen on the variable speed, agility, coordination, balance, explosive power and flexibility.

Keywords: physical fitness, private, government, girls

Introduction

Extensive evidence signifies that physical fitness levels in children and adolescents are indicators of their standard of living and their cardio-metabolic health status and are the predictors of the potential threat of chronic ailments such as obesity, cardio-metabolic problems, physiological and mental health (Ramos-Sepúlveda, 2016) [1]. Physical inactivity and sedentary behavior among Indian adolescents is on rise, resulting in lower level of physical fitness and obesity problems (Singh & Singh, 2017; Katapally *et al* 2016) [17, 9]. It has been a well proven fact that physical fitness is directly associated with enhanced health outcomes in children. Moreover, it has an inverse relationship with overweight among adolescents (Bovet *et al*, 2007) [2]. Lower level of physical fitness is associated with enhanced cardio metabolic risk and obesity into adulthood (Bovet *et al*, 2007) [2]. Previous studies had mainly reported the effects of adolescent obesity on psychosocial problems (Mellin *et al*, 2002; Neumark-Sztainer *et al*, 1997; Sweeting *et al*, 2005) [3-5] and typical risk factors of cardiovascular diseases (Morrison *et al*, 1999; Freedman *et al*, 1999) [6, 7] whereas evidence on health-related physical fitness is scarce. Padmapriya, Sujaya (2013) [8] in their study found decreasing trends in physical fitness among adolescents and also noticed lower level of Vo2 max among girls as compared to their counterpart boys. It has been argued that the girls have shown better in performance than boys in pre-adolescent period (Sallis *et al*., 1992) [11]. Moreover, pal *et al* (2014) [12] reported that rural primary girls possess better flexibility than boys. With regard to private and government school boys fitness, Singh *et al* (2017) [10] reported that government school boys of 11-14 year were significantly better than private school boys on the variable coordination, balance, handgrip strength and % body fat. However, to the author's knowledge, no study has provided empirical data regarding the differentials of physical fitness among school girls who are exposed to different socio-economic environmental settings. This study is an attempt to differentiate the girls of private and government schools on different physical fitness variables.

2. Methods and Materials
2.1 Selection of subjects
The present study recruited 381 school girls aged 11-14 years from different private and government schools of Amritsar district of Punjab, India. The total sample comprised of 230 girls of private and 151 from government.

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The purposive sampling technique was followed for selecting the participants.

2.2 Methods of data collection

Table 1: Description of variables, tests and measuring units

Variable	Test	Measuring unit
Speed	30 meter dash	Seconds
Agility	Illinois agility test	Seconds
Coordination	Alternate hand wall toss test	Maximum counts
Balance	Stork stand test	Seconds
Reaction time	Ruler drop test	Seconds
Handgrip strength	Handgrip dynamometer	Kilograms
Endurance	600 meter run/walk	Seconds
Explosive power	Standing broad jump	Meters
Flexibility	Sit and reach test	Centimeters
% Body fat	Slaughter's equation	Percentage

2.3 Statistical analysis

Descriptive statistics of both groups are presented as means and standard deviation. Independent t-test was employed to assess the differences between means of both groups in each age group from 11-14 years. The significance level was set at 0.05 level.

3. Results and Findings

Table 2: Comparison of physical fitness variables between girls of private and government students

Variable	Private (n=230)		Government (n=151)		t-value	p-value
	Mean	SD	Mean	SD		
Speed	8.40	0.77	8.47	0.80	0.83	0.41
Agility	23.91	2.27	23.74	2.33	0.71	0.48
Coordination	12.82	2.93	12.90	3.03	0.24	0.80
Reaction time	0.193	0.032	0.185	0.030	2.34	0.02*
Balance	13.50	3.74	13.70	3.10	0.52	0.59
Handgrip Strength	9.87	3.06	10.55	2.68	2.17	0.03*
Endurance	167.17	21.72	162.75	21.00	2.12	0.04*
Power	1.41	0.19	1.39	0.22	0.88	0.38
Flexibility	31.51	7.38	32.04	7.38	0.67	0.48
% Body Fat	21.41	6.27	23.66	5.85	3.50	0.001*

*Significant at .05 level

Table 2 depicts the mean, standard deviation, t-values and p-values of physical fitness variables of private and government school girls. With respect to the variable reaction time, mean and standard deviation of private and government school girls were 0.193±0.032 and 0.185±0.030 respectively. Results of t-test (t=2.34, $p<0.05$) shows that both groups differed significantly on the variable reaction time and girls from government schools had better reaction time than private school girls. Similarly, comparison of both groups on the variable handgrip strength reveals significant difference between both group (t=2.17, $p<0.05$). Mean and standard deviation of private and government school girls was 9.87±3.06 and 10.55±2.68 respectively, these results shows that government school girls have better handgrip strength than private school girls. Likewise, both groups differ significantly when compared on the variable endurance (t=2.12, $p<0.05$). Mean and standard deviation of private and government school girls were 167.17±21.72 and 162.75±21.00 respectively which confirm that government school girls have better endurance than the private school girls. Further, significant difference was noticed on the variable % body fat (t=3.50, $p<0.05$). Mean and standard

deviation of private and government school girls were 21.41±6.27 and 23.66±5.85 respectively. These results confirm that private school girls have less % body fat than government school girls. Meanwhile, no significant differs were assessed on the variables speed, agility, coordination, balance, explosive power and flexibility.

Table 3: Comparison of physical fitness variables between girls of 11 year between private and government students

Variable	Private (n=63)		Government (n=38)		t-value	p-value
	Mean	SD	Mean	SD		
Speed	8.17	0.73	8.43	0.74	1.72	0.09
Agility	24.00	2.29	23.15	2.31	1.80	0.08
Coordination	12.43	3.00	12.87	2.91	0.72	0.46
Reaction time	0.201	0.032	0.185	0.025	2.85	0.005*
Balance	12.89	3.45	13.12	3.43	0.31	0.75
Handgrip Strength	10.08	3.06	10.23	2.83	0.23	0.81
Endurance	166.98	21.84	163.34	20.03	0.84	0.39
Power	1.44	0.22	1.45	0.23	0.20	0.83
Flexibility	32.05	7.12	32.00	7.91	0.02	0.98
% Body Fat	21.20	5.93	23.62	5.30	2.07	0.03*

*Significant at .05 level

Table 3 shows the mean, standard deviation, t-values and p-values of physical fitness variables of private and government school girls of age 11 years. With respect to the variable reaction time, mean and standard deviation of private and government school girls were 0.201±0.032 and 0.185±0.025 respectively. Results of t-test (t=2.85, $p<0.05$) shows significant differences between the both on the variable reaction time. It can be interpreted that girls from government schools had better reaction time than private school girls. Further, significant difference was noticed on the variable % body fat (t=2.07, $p<0.05$). Mean and standard deviation of private and government school girls were 21.20±5.93 and 23.62±5.30 respectively. These results confirm that private school girls have more % body fat than government school girls. Meanwhile, no significant differs were assessed on the variables speed, agility, coordination, balance, handgrip strength, endurance, explosive power and flexibility.

Table 4: Comparison of 12 year old girls of private and government schools

Variable	Private (n=58)		Government (n=47)		t-value	p-value
	Mean	SD	Mean	SD		
Speed	8.63	0.72	8.50	0.87	0.92	0.36
Agility	23.73	2.24	23.74	2.30	0.04	0.96
Coordination	12.83	3.06	12.81	2.83	0.02	0.95
Reaction time	0.187	0.035	0.183	0.032	0.633	0.528
Balance	13.09	3.96	13.18	3.23	0.15	0.87
Strength	10.00	3.13	10.81	2.77	1.41	0.15
Endurance	166.14	22.63	162.36	22.25	0.86	0.38
Power	1.39	0.18	1.35	0.22	1.00	0.31
Flexibility	31.42	7.61	32.52	7.39	0.75	0.46
% Body Fat	21.56	6.50	22.88	6.31	1.01	0.31

*Significant at .05 level

Table 4 demonstrates the mean standard deviation, t-values and p-values of physical fitness variables of private and government school girls of age 12 years. It is confirmed from the above results that no variable showed significant

differences between both groups in 12 year age group.

Table 5: Comparison of 13 year old girls of private and government schools

Variable	Private (n=54)		Government (n=31)		t-value	p-value
	Mean	SD	Mean	SD		
Speed	8.43	0.77	8.58	0.84	0.82	0.42
Agility	23.98	2.28	23.64	2.42	0.62	0.54
Coordination	12.97	2.74	13.15	3.26	0.26	0.79
Reaction time	0.188	0.028	0.184	0.032	0.589	0.558
Balance	13.89	3.35	14.15	2.52	0.38	0.70
Strength	9.85	3.08	10.93	2.57	1.64	0.09
Endurance	163.30	21.10	161.74	22.04	0.31	0.75
Power	1.37	0.21	1.36	0.21	0.23	0.82
Flexibility	32.80	7.92	31.47	6.55	0.78	0.42
% Body Fat	21.59	6.08	18.16	3.76	2.81	0.01*

*Significant at .05 level

Table 5 depicts the mean, standard deviation, t-values and p-values of physical fitness variables of private and government school girls of age 13 years. It can be noticed from the above table that only % fat body showed significant differences between both groups (t=2.81, p<0.05). The mean and standard deviation of private and government school girls was 21.59±6.08 and 18.16±3.76 respectively. Accordingly, it can be interpreted that government school girls of age 13 year had more % body fat as compared to their counterparts. On the other hand, no significant difference was found between both groups on the variable speed, agility, coordination, reaction time, balance, handgrip strength, endurance, power and flexibility.

Table 6: Comparison of 14 year old girls of private and government schools

Variable	Private (n=55)		Government (n=35)		t-value	p-value
	Mean	SD	Mean	SD		
Speed	8.43	0.81	8.60	0.93	0.91	0.36
Agility	23.91	2.32	24.44	2.28	1.04	0.29
Coordination	13.15	2.95	12.89	3.35	0.40	0.68
Reaction time	0.192	0.029	0.189	0.030	0.507	0.613
Balance	14.24	4.14	14.56	2.84	0.38	0.68
Strength	9.54	2.98	10.18	2.54	1.01	0.31
Endurance	172.27	20.76	162.40	19.02	2.26	0.03*
Power	1.41	0.18	1.38	0.20	0.72	0.46
Flexibility	29.75	6.72	31.96	7.73	1.43	0.14
% Body Fat	21.32	6.75	23.67	6.10	1.67	0.10

*Significant at .05 level

Table 6 demonstrates the mean, standard deviation, t-values and p-values of physical fitness variables of private and government school girls of age 14 years. It can be confirmed from the above table that significant difference was assessed only on variable endurance (t=2.26, *p*<0.05). The mean and standard deviation of private and government schools girls was 172.27±20.76 and 162.40±19.02 respectively. The differences in mean value confirm that government school girls had better endurance than their counterparts. At the same time, the variables speed, agility, coordination, reaction time, balance, handgrip strength, power, flexibility and % body fat showed insignificant differences between the both groups.

4. Discussion
The present piece of research explored the physical fitness differences on selected variables between the girls of private and government schools of age 11-14 years. In overall sample, results confirmed that government school girls were better than private school girls on the variable reaction time, handgrip strength and endurance whereas private school girls showed less % body fat than their counterparts. In 11 year age group, differences were seen on only in reaction time and % body fat in which government school girls possessed better reaction time whereas private school girls showed less % body fat. However, no significant differences were noticed on any variable in 12 year age group. In 13 year age group, private school girls had significantly less % body fat than government school girls. In 14 year age group, it was found that government school girls had significantly better endurance than their counterparts. Interestingly, the variable % body fat that has consistently shown differences between both groups did not showed any significant difference with increased age. The girls studying in private schools generally come from the higher socio-economic families. The easy access to comfort living and technological gadgets led the children to spend more sedentary lifestyle and inactive living could be some factors of lower physical fitness among private school girls. The results are in agreement to a previous study on done boys of government and private schools that reported better physical fitness among government school boys (Singh *et al*, 2017) [10].

5. Conclusions
On the basis of empirical findings of this study, it can be concluded that government school girls are better than private school girls on some selected physical fitness components. Future research with comprehensive sample size is recommended.

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