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Variations in speed and strength characteristics of girls belonging to different socio-economic groups

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Abstract
The purpose of the study was to carry out speed and strength assessments of girls belonging to different socio-economic groups i.e., high, middle and low socio economics groups. The subjects for the study were 500 girls studying in different schools of Delhi. Using appropriate testing procedures, Speed (50m dash) as well as Strength (Legs Explosive Strength) of the subjects was tested. The data was analysed using descriptive as well as Analysis of Variance (F-test). Scheffe's Test was applied in case the F-ratio was significant. In respect of Speed, the study concluded that girls belonging to high and middle socio-economic groups are significantly better as compared to girls belonging to low socio-economic group. The differences are significant at 0.05 level of confidence. No significant difference was observed in the same variables between high and middle socio-economic groups. With regard to Legs Explosive Strength the findings reveal that the girls belonging to Low Socio-economic Group is significantly superior to that of High and Middle Socio-economic Groups. The difference is significant at 0.05 level of confidence. High and Middle Socio-economic Groups do not significantly differ from each other with respect to each other.

Keywords: Speed, strength, socio-economic groups

Introduction
Physical fitness is a significant feature of life. The complete physical preparation of a sports person requires development of all important motor components, namely strength, speed, endurance, flexibility, agility, coordination and balance. A broad critical survey reveals that there is a difference in the choice of sport with respect to subjects belonging to different socio-economic groups. There can be many causes for this. Obviously, the affluent sections have more free time, ample resources and easier access to all essential facilities, that the socio-economic fund is a powerful and decisive factor in pushing young people to choose sports activities and also to choose certain types of sports. Apparently, all the players seem to be equally competent but a careful critical in-depth analysis of the factor on the bases of certain objective observations and findings also reveal that the choice of the sports by youngsters is not a simple phenomenon but it is deeply connected with the socioeconomic background of the sportsperson.

The socio-economic status of an individual may influence his opportunity, his desire to excel, his choice of activity and his success. The home environment often influences his motivation to succeed in sports and the degree of this success in this endeavour leads to inner satisfaction. The socio-economic status has been recognized as a decisive factor in sports participation of the various kinds of sportsperson, because it is the factor that exercises a decisive influence on any individual's physical fitness, performance and achievement in sports. It is generally observed that the choice of sport is greatly influenced by the socio-economic status. It is normally seen that sports like cricket, tennis, Shooting etc. are engaged in by children who come from affluent families where as sports like kabaddi, wrestling, Kho-Kho, etc. are more commonly popular among sports person belonging to low and middle socio-economic group.

Stalsberg and Pedersen (2018) [12] conducted a study in order to find out differences in physical activity across socio-economic groups associated with choice of physical activity variables. The study was based on the hypothesis that individuals of higher socioeconomic status (SES) are more physically active than their lower SES counterparts. Fifty-six studies were included and were subsequently split into four physical activity (PA) domains that are transport PA (TPA), occupational PA (OPA), housing PA (HPA) and leisure time PA (LTPA).

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The positive relationship was found only in the case of LTPA, whereas relationship was non-existent or even opposite for all other domains. It was finally concluded that the obtained positive relationship between SES and PA is mainly a relationship between LTPA and SES. It is further suggested in the study that the PA domain should always be considered when studying said relationships.

The purpose of the study undertaken by Gagandeep *et al.* (2017) [9] was to evaluate the differences of physical fitness between girls belonging to private and government schools of Amritsar district of Punjab. The sample of the study comprised of 381 girls selected from different private and government schools. The variables tested were speed, agility, handgrip strength, endurance, explosive power, coordination, balance, reaction time, flexibility, % body fat. The data was analysed using. Student's independent t-test was employed for analysis of data. The findings of the study showed that girls belonging to government school performed better in reaction time, handgrip strength and endurance whereas private school girls were found to be having less % body fat as compared to their counterparts. No differences were noted with respect to speed, agility, coordination, balance, explosive power and flexibility.

Methodology
Selection of Subjects
The subjects for the study were 500 Girls whose age ranged between 14 to 16 years. The selection of subjects was done at random. They were studying in the following schools of Delhi.
1. Kamal Model Public School, Mohan Garden, Delhi
2. Angel Public School Delhi, Vasundhara Enclave, Delhi
3. Government Girls Seniors Secondary School, Nangloi Delhi
4. RPVV, Ludlow Castle, Rajniwas Marg, Delhi

Due permission was sought from the school management before collection of necessary data related certain variables. The Socio-economic Questionnaire developed and standardized by Kuppu Swamy was administered to the subjects in their respective schools. Based on the norms the subjects were divided into three socio-economic status groups' i.e. high socio-economic status, middle socio-economic status and low socio-economic status.

Selection of Variables

Table 1: The variables selected, tests used and their units of measurements were as follows:

S. No.	Variable	Test	Unit of Measurement
1	Speed	50m dash	Second
2	Leg Strength	Standing Broad Jump	Meter

The data was collected in the above variables by the research scholar with the help of teachers working in respective institutions. Prior to administration of test the teachers were made aware of the correct testing procedure in the selected variables.

For testing the significance of difference in the selected variables among subjects belonging to three socio-economic groups' one-way analysis of variance (F-test) was applied. The level of significance chosen was 0.05 level of confidence, which was considered adequate for the purpose of the study.

Findings

Table 2: Descriptive statistics of speed for girls belonging to selected socio-economic groups

		N	Mean	Std. Deviation	Std. Error
Speed	High Socio-economic	105	10.8346	2.04039	0.19912
	Middle Socio- economic	187	10.6357	2.30886	0.16884
	Low Socio-economic	208	9.3096	1.94652	0.13497
	Total	500	10.1258	2.21525	0.09907

Table 2 presents the descriptive analysis in respect of Speed for girls belonging to High Socio-economic, Middle Socio-economic and Low Socio-economic groups. The mean and standard deviation values in respect of High Socio-economic, Middle Socio-economic and Low Socio-economic groups are M = 10.8346, SD = 2.04039; M = 10.6357, SD = 2.30886; M = 9.3096, SD = 1.94652 respectively.

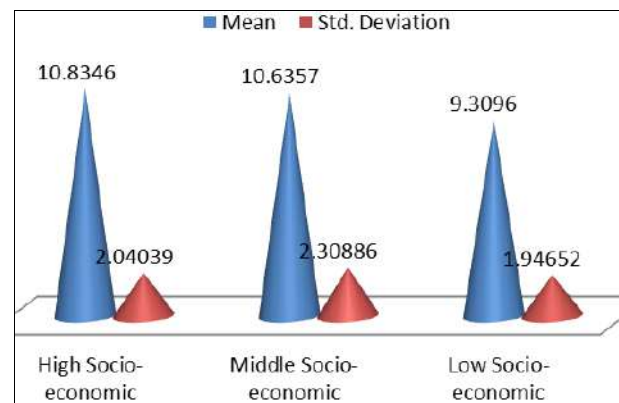The means and standard deviations in respect of girls with regard to Speed are presented in Fig.1

Fig 1: Means and SD of speed for girls

Table 3: ANOVA of speed for girls belonging to different socio-economic groups

		Sum of Squares	DF	Mean Square	F	Sig.
Speed	Between Groups	239.932	2	119.966	26.993*	.000
	Within Groups	2208.818	497	4.444		
	Total	2448.750	499			

*Significant at 0.05 level F (2 and 497) =3.01

The analysis of data in the above table 3 clearly shows that the F-ratio of 26.993 is statistically significant at 0.05 level of confidence. The F-ratio obtained is more than the table value of 3.01 with 2 and 497 degrees of freedom. In order to find out variance in different socio-economic groups with respect to Speed, Scheffe's test was applied and data pertaining to this is presented in the following table.

Table 4: Post-hoc comparison of speed for girls using the scheffe's test

Dependent Variable	(I) Socio-economic Status	(J) Socio-economic Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Speed	High Socio- economic	Middle Socio- economic	.19885	.2570	.742	-0.4323	.8300
		Low Socio- economic	1.5249*	.2523	.000	0.9053	2.1446
	Middle Socio- economic	High Socio- E-economic	-.19885	.2570	.742	-0.8300	.4323
		Low Socio Economic	1.3261*	.2124	.000	0.8045	1.8477
	Low Socio- economic	High Socio- economic	-1.5249*	.2523	.000	-2.1446	-.9053
		Middle Socio- economic	-1.3261*	.2124	.000	-1.8477	-.8045

Analysis of data in table 4 shows that Speed of girls belonging to High Socio-economic and Middle Socio-economic groups is significantly higher as compared to girls belonging to Low Socio-economic group whereas the difference in Speed in the High Socio-economic and Middle Socio-economic groups is statistically not significant. Middle Socio-economic group has significantly higher speed as compared to Low Socio-economic group.

Table 5: Descriptive statistics of explosive leg strength for girls belonging to selected socio-economic groups

		N	Mean	Std. Deviation	Std. Error
Explosive Leg Strength	High Socio- economic	105	1.6486	0.35548	0.03469
	Middle Socio- economic	187	1.7028	0.35136	0.02569
	Low Socio- economic	208	1.8375	0.33832	0.02346
	Total	500	1.7475	0.35500	0.01588

Table 5 reveals the descriptive analysis of Explosive Leg Strength of girls belonging to High Socio-economic, Middle Socio-economic and Low Socio-economic groups. The mean and standard deviation values of Explosive Leg Strength for High Socio-economic, Middle Socio-economic and Low Socio- economic groups are M = 1.6486, SD = 0.35548; M = 1.7028, SD = 0.35136; M = 1.8375, SD = 0.33832 respectively.

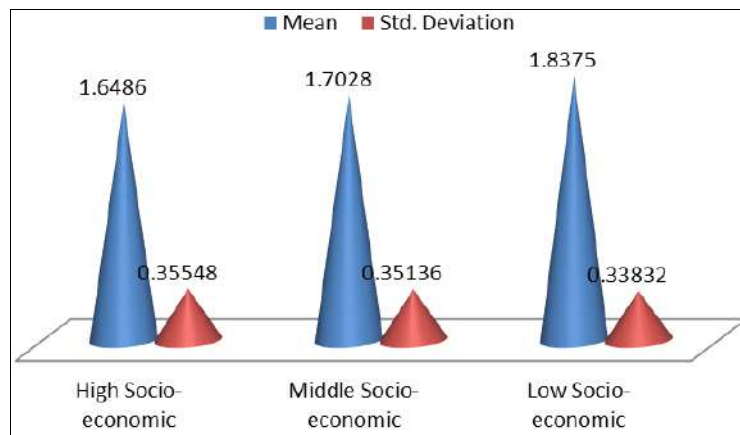The means and standard deviations in respect of girls with regard to Explosive Leg Strength are presented in Fig.2

Fig 2: Means and SD of Girls for Explosive Leg Strength

Table 6: Anova of Explosive Leg Strength for Girls Belonging to Different Socio-economic Groups

		Sum of Squares	DF	Mean Square	F	Sig.
Explosive Leg Strength	Between Groups	3.087	2	1.544	12.83*	.000
	Within Groups	59.798	497	.120		
	Total	62.885	499			

*Significant at 0.05 level F (2 and 497) =3.01

The above table 6 evidently shows that the F-ratio of 12.83 is statistically significant at 0.05 level of confidence. The F-ratio obtained is more than the table value of 3.01 with 2 and 497 degrees of freedom. In order to find out variance in different socio-economic groups with respect to Explosive Leg Strength, Scheffe's test was applied and data pertaining to this is presented in the following table.

Table 7: Post-hoc comparison of explosive leg strength for girls using scheffe's test

Dependent Variable	(I) Socio-economic Status	(J) Socio-economic Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Explosive Leg Strength	High Socio- economic	Middle Socio- economic	-.0542	.0423	.440	-.1581	.0496
		Low Socio- economic	-.1889*	.0415	.000	-.2909	-0.0870
	Middle Socio- economic	High Socio- economic	.05426	.0423	.440	-.0496	0.1581
		Low Socio- economic	-.1347*	.0349	.001	-.2205	-0.0489
	Low Socio- economic	High Socio- economic	.18898*	.0415	.000	.0870	0.2909
		Middle Socio- economic	.13471*	.0349	.001	.0489	0.2205

Analysis of data in table 7 shows that Explosive Leg Strength of girls belonging to both High and Middle Socio-economic groups is significantly higher as compared to girls belonging to Low Socio-economic. No significant difference has been seen in this variable between High and Middle Socio-economic groups.

Discussion of findings
The research studies already completed with respect to performance of different socio-economic groups in respect of Motor Fitness Components show that socio-economic status is an important characteristic that effects on involvement in games and sports. The studies have stated that people with higher socio-economic status are more likely to involve in physical activity than those belonging to lower socio-economic groups and subjects who belong to higher socio-economic groups have a significantly better performance in some of the motor components namely speed, agility, explosive strength, rhythm ability etc. because of the fact that higher socio-economic status could provide the youths better facilities in terms of sport equipment's acquisition, participation in sport sessions involving extracurricular activities as well as good awareness of their parents regarding the importance of having good fitness. In addition, a well-balanced diet comprising of carbohydrates, proteins, fats, vitamins, minerals and fiber in proper proportion as well as quality might help in the proportionate development of the body and that might also be one of the factors ensuring better motor fitness status of subjects belonging to higher socio-economic status. The present findings are not fully in agreement with studies already completed by Pavon *et al*. (2010) [7] and Kodli (2016) [7]. Their studies have reported a positive association between socio-economic status and Speed as well as strength performance. In the light of this there is a need to conduct further research in the same area in order to arrive at definite conclusions.

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