

COMPARATIVE STUDY ON SELECTED MOTOR PERFORMANCE COMPONENTS FOR 12-16 YEARS SCHOOL GOING BOYS OF NORTH 24 PARGANAS DISTRICT IN WEST BENGAL

¹ DR. PRADIP KUMAR PAUL ² DR. KRISHNA BANERJEE

¹ Dr. Pradip Kumar Paul, Assistant Teacher, Naihati Narendra Vidyaniketan, 24 Pgs (N), WB, India

² Dr. (Mrs.) Krishna Banerjee, Professor, Dept. of Physical Education, Univ. of Kalyani, WB, India

ABSTRACT

The purpose of the study was to determine the existence of statistically significant difference on selected motor performance components i.e, speed, agility, leg explosive strength, coordination and endurance among 12 to 16 years male students of North 24 Parganas District in West Bengal. For this reason, 150 male students of 12, 13, 14, 15 and 16 years age group were considered as subjects. The subjects were selected randomly from the school of Naihati Narendra Vidyaniketan. The selected motor performance parameters were restrained to Speed, Agility, Leg Explosive Strength, Coordination and Endurance using standardized tests and procedures. The data on the motor performance parameters were analyzed by applying ANOVA to find out significant differences if any among the age groups and Scheffe's post hoc test. The level of significance to assess the statistical values obtained was set at 0.05 and also 0.01 level of confidence. The research findings ensure statistically considerable age difference on selected variables and it implies that age differences influence almost all motor performance parameters.

Keywords- Motor Performance Components and 12-16 years boys.

INTRODUCTION:

The fitness components are qualities that athletes must develop to physically prepare for sport competition. The basic definition of physical fitness is "the ability to complete daily task with energy, reduce health risk due to inactivity, and be able to participate in a variety of physical activities." Each individual has his own unique heredity and nature and will travel along that highway at his own rate of progress and will attain the size, shape, capacity and developmental status which are uniquely his own at each stage of the life career. Performance means to get into action as much higher degree as possible. There are four major groups of factor that are responsible for athletic performance. (i) Genetic traits. (ii) Acquisition of specific skills, (iii) Specific type and level of physical fitness, (iv) General psychological fitness. Sports

performance is a unity of execution and result of sports action or a complex sequence of sports action measured or evaluated according to agreed and socially determined norms. The general anthropometric measures are depending upon the genetic factor, one inherited from his ancestors who ultimately influence the athletic performance. Performance related fitness, is necessary for the execution of sports skill. Speed, strength, power, endurance, balance, co-ordination, agility, reaction time etc., are the components of performance related fitness. It is for the performers who targeted for a goal.

THE PURPOSE OF THE STUDY:

- 1) To observe the motor ability status of the 12 - 16 years boys.
- 2) To analysis and compare the age wise differences, if any, the selected motor performance variables among the 12 - 16 years boys.
- 3) To study the relationship among selected motor performance variables of said age group boys.

METHODOLOGY:

Subjects-

The subjects of the present study were selected randomly from the school Naihati Narendra Vidyaniketan, 24 Pgs (N), WB, India. Thirty students of each age group's i.e. total 150 boy's students were randomly selected for this purpose.

Criterion Measured-

Parameters

- 1) Agility (sec)
- 2) Leg Explosive Strength (cm.)
- 3) Speed (sec)
- 4) Coordination(no.of times in 30s)
- 5) Endurance

Measured by

- 4 × 10 mt. Shuttle Run
- Standing Broad Jump
- 50 mt Run
- Wallpass
- 600 yd Run & Walk

Statistical Procedure-

The data on the growth and motor performance parameters were analyzed by applying ANOVA to find out significant differences if any among the various age groups and Scheffe's post hoc test.

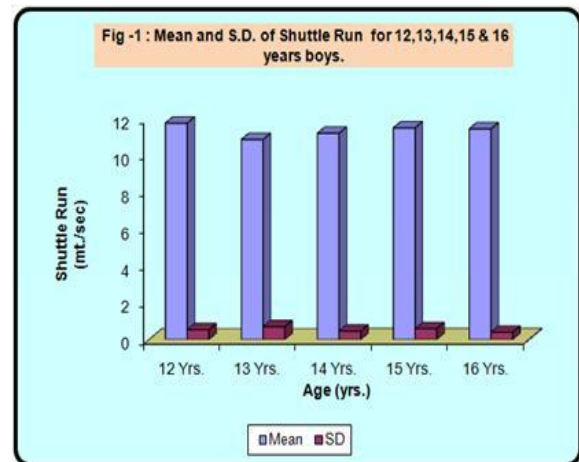
RESULT & DISCUSSION:

Discussions were made on the basis of the findings of the present study and compared with available literatures.

Shuttle Run

Table-1: Mean and SD of Shuttle Run (m /s) among the five groups (12, 13, 14, 15 & 16 year's boys)

Age of Subjects	Mean	S.D.
12 yrs.	11.75	0.53
13 yrs.	10.86	0.70
14 yrs.	11.20	0.46
15 yrs.	11.49	0.59
16 yrs.	11.44	0.40



Among the five groups the mean score of shuttle Run were 11.75, 10.86, 11.20, 11.49 and 11.44 with variations ± 0.53 , ± 0.70 , ± 0.46 , ± 0.59 and ± 0.40 respectively. It was found from the above table that 13 years boys were better in agility test than others.

Table-2: Analysis of Variance among the five age groups for Shuttle Run (m / sec).

Source of Variation	SS	df	MS	F
Between Groups	13.47	4	3.37	11.21 **
Within Groups	42.36	141	0.30	
Total	55.82	145		

It appeared from the table-2 that the mean score of Shuttle Run among the five groups were not equal. So, it was necessary to conduct ANOVA for observing significant mean difference and the 'F' value was found to be 11.21 which were significant at 0.05 and 0.01 level. Several investigators reported agility improved rapidly before puberty because of early maturation of central nervous system. Agility is dependent to some extent, on speed and coordination. From the Table-7 it may be seen that in speed performance (50 mt. run) the direction of mean scores of the five groups were identical with the agility performance scores. Clarke (1971) opined from a study of shuttle run that the performance increased in a straight line rise from ages 8 to 14 years. Jenson and Fisher (1979) reported that young children increased steadily in agility to about the age of 13 years.

Table-3: Comparisons of paired means of Shuttle Run

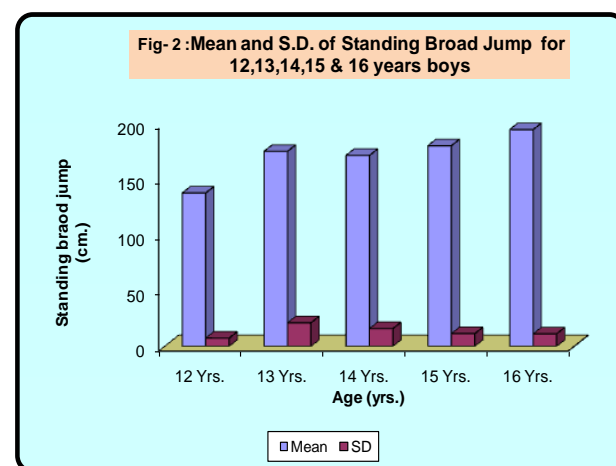
Age(yrs.)	13	14	15	16
12	0.88 **	0.55**	0.26 ^{N.S.}	0.30 *
13		-0.34*	-0.62**	0.58**
14			0.28*	0.24 ^{N.S.}
15				0.04 ^{N.S.}

Among the five groups 12 years boys took the maximum time followed by 15, 16, 14 and 13 years boys (Table-1). It means 13 years group boys were more agile than all other groups. It appeared from the Table-3 that the mean difference between the groups in respect of Shuttle run was significant, except the mean differences between 12 & 15, 14 & 16 and 15 & 16 years group. Analyzing all the relevant data and statistical treatment, it appeared that 12 years group took maximum time and obviously therefore, had poor performance, followed by 15, 16, 14 and 13 years. It may be seen from the performance record 13 years boys performed better than all the groups. Accordingly the groups may be arranged on the basis of agility performance 13>14>16>15>12. Analyzing the present study it may be concluded that this study was in agreement with the findings of the other researchers.

Standing Broad Jump

Table-4: Mean and S.D. of SBJ (cm.) among the five groups (12, 13, 14, 15 & 16 years boys.

Age of Subjects	Mean	S.D.
12 yrs.	137.67	7.39
13 yrs.	175.10	21.19
14 yrs.	171.37	15.92
15 yrs.	180.13	11.43
16 yrs.	194.65	11.27



Higher the age higher was the leg explosive strength, except 14 years boys group. Ellis et al. (1975), Kansal (1982), Halder et al. (1987) found a significant increase on performance for all physical performance tests from 10 through 16 years of age. The largest percentage increase occurred between 14 and 15 years for Standing Broad Jump. Chauhan et al. (1987) studied to determine the role of anthropometric variables on performance in standing broad jump of 42 college women, aged 18 to 23 years and age had been found to be positive and significant relationship with performance of standing broad jump.

Table-5: Analysis of Variance among the five age groups for Standing Broad Jump (cm.)

Source of Variation	SS	df	MS	F
Between Groups	50887.69	4	12721.92	62.03 **
Within Groups	28919.68	141	205.10	
Total	79807.38	145		

The mean scores among the five groups were not equal. ANOVA was calculated in Table-5 and 'F' value was 62.03 which were found statistically significant. Slaughter et al. (1982) observed that the average broad jump performance of 11.0-11.9 years old American boys were 60 inches (152.4 cm.).

Table-6: Comparisons of paired means of Standing broad jump

Age	13	14	15	16
12	37.43**	33.7**	42.46**	56.98**
13		3.73 ^{N.S.}	5.03 ^{N.S.}	19.55**
14			8.76*	23.28**
15				14.52**

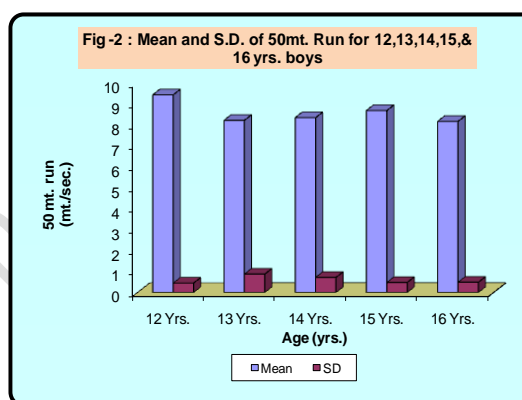
It was observed from the Table-6 that the mean difference between the groups in respect of Standing Broad Jump was highly significant. Only mean difference between 13 & 14 and 13 & 15 years group were not significant but all the groups were significantly different. Therefore, jumping ability (Standing Broad Jump performance) of the groups may be arranged in

descending order as $16 > 15 > 13 > 14 > 12$. So, from the findings of the present study it may be concluded that leg explosive Strength of boys increases with the increase in age except 14 years which corroborates with the findings of Chatterjee et al. (1992). Malina and Bouchard (1985) had also reported that shorter stature had a negative influence of jumping ability. Millicer (1964) and Winter (1976) has specifically mentioned that rapid increase in strength is largely limited to maximum strength and explosive strength. Some other factors like social and economic factors (Synder, 1970); intensity of habitual physical activity, participation in extramural and physical education program etc. might be the underlying reason which affected strength performances of lower extremities.

50 m Run

Table-7: Mean and S.D. of 50mt. Run (m/s) among the five groups (12, 13, 14, 15 & 16 year's boys)

Age of Subjects	Mean	S.D.
12 yrs.	9.45	0.45
13 yrs.	8.23	0.88
14 yrs.	8.36	0.72
15 yrs.	8.70	0.48
16 yrs.	8.18	0.49



In this test better the performance lesser was the time. From the table it was observed that the mean values of 50m run among the five groups were 9.45, 8.23, 8.36, 8.70 and 8.18 with the variations of ± 0.45 , ± 0.88 , ± 0.72 , ± 0.48 , and ± 0.49 respectively. Highest performance was observed in 16 years boys.

Table-8: Analysis of Variance among the five age groups for 50mt. Run (m /s)

Source of Variation	SS	df	MS	F
Between Groups	32.59	4	8.15	20.42 **
Within Groups	56.25	141	0.40	
Total	88.84	145		

The scores of performance in 50mt. run among the five groups were statistically significant so there were differences in mean scores. So, it may be concluded that 16 years boys were better in 50mt. run performance than 12, 13, 14 and 15 years boys. Cratty (1979) conducted a study of

running speed of infant and children and concluded that both boys and girls improved speed with age at about 1 ft. per second per year from ages 6 to 11 years. According to Sing (1979) motor ability was best trainable in the time period in which it showed the maximum rate of growth. Chatterjee, et al. (1992) had also reported that gradual increase in motor fitness measurements with the advance of age on school going boys. The increase in speed ability of boys may due to rapid improvement of explosive leg strength and movement frequency. Winter (1976) and Koinzer (1978) reported that sprint performance depends upon leg strength and leg length and these two aspects, possibly, influenced the significant improvement in speed performance from 12 to 16 years.

Table-9: Comparisons of paired means of 50 mt. run

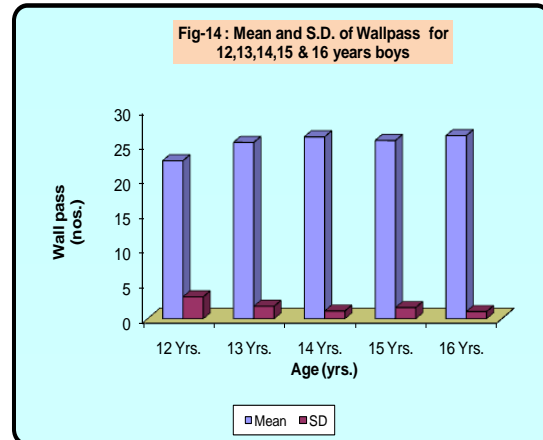
Age	13	14	15	16
12	1.22**	1.09**	0.74**	1.26**
13		0.12 ^{N.S}	0.47**	0.04 ^{N.S}
14			0.34*	0.17 ^{N.S}
15				0.51**

It was observed from the Table-9 that the mean difference between the groups in respect of 50m run was statistically significant. But the mean difference between 13 & 14, 13 & 16 and 14 & 16 years group were not statistically significant. Speed performance of 12 years boys was significantly lower than that of 13, 14, 15 and 16 years boys. It appeared that 16 years boys had the best speed performance among the five groups Therefore, 50mt. run of the groups may be arranged in descending order as 16>15>13>14>12.

Wallpass

Table-10: Mean and S.D. of Wallpass among the five groups (12, 13, 14, 15 & 16 years boys)

Age of Subjects	Mean	S.D.
12 yrs.	22.67	3.15
13 yrs.	25.30	1.80
14 yrs.	26.10	1.12
15 yrs.	25.57	1.61
16 yrs.	26.27	1.04



Analyzing the present study it was observed that 16 years boys had performed better than all the other groups and 12 years group performed lower score than all other group. Therefore, it may be inferred that the wallpass performance score was related to the age of the subjects.

Table-11: Analysis of Variance among the five age groups for Wallpass (no. of times)

Source of Variation	SS	df	MS	F
Between Groups	250.54	4	62.03	16.91 **
Within Groups	522.15	141	3.70	
Total	772.68	145		

It appeared that the computed 'F' value was 16.91 which were much higher than the table value of 'F' to be significant. Mean scores of wallpass were statistically different. Barnekow-Bergkvist et al. (1998) found that performance in physical tests; height, weight and physical activity at the age of 16 contributed best of explain adult physical performance and physical activity.

Table-12: Comparisons of paired means of Wall pass

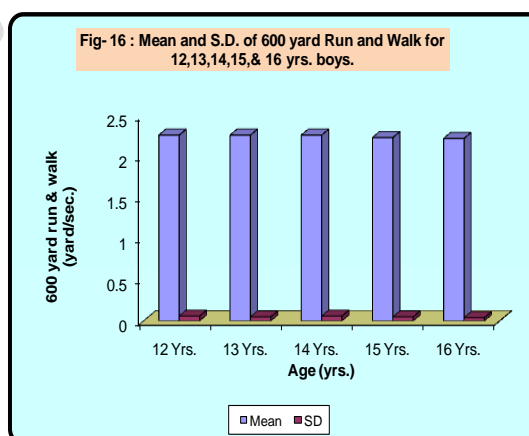
Age	13	14	15	16
12	2.63**	3.43**	2.9**	3.60**
13		0.8 ^{N.S}	0.26 ^{N.S}	0.96 ^{N.S}
14			0.53 ^{N.S}	0.16 ^{N.S}
15				0.70 ^{N.S}

It appeared from the Table-12 that the mean difference between the groups in respect of wall pass (hand-eye coordination) was statistically significant, except mean difference between 13 & 14, 13 & 15, 13 & 16, 14 & 15, 14 & 16 and 15 & 16 years group. Therefore, it may be concluded that so far wall pass was concerned age factor was responsible for the higher mean value except 14 years boys. 16 years boys having higher age, they had significantly performed better in comparison to all other groups. Therefore groups may be placed in descending order of performance as: 16>14>15>13>12.

600 yard Run and Walk

Table-13: Mean and S.D. of 600 yd R & W (yd/s) among the five groups (12, 13, 14, 15 & 16 yr's boys).

Age of Subjects	Mean	S.D.
12 yrs.	2.26	0.06
13 yrs.	2.26	0.05
14 yrs.	2.26	0.06
15 yrs.	2.23	0.05
16 yrs.	2.22	0.04



It was found from Table-18, the mean scores of 600 yard run and walk of 12 yrs., 13yrs., 14yrs., 15yrs., and 16yrs. boys were 2.26, 2.26, 2.26, 2.23 and 2.22 min respectively with variations of ± 0.06 , ± 0.05 , ± 0.06 , ± 0.05 and ± 0.04 respectively. In this test better performance means less time to cover the equal distance i.e. 600 yards.

Table-14: Analysis of Variance among the five groups for 600 Yd Run & Walk (yd/m)

Source of Variation	SS	df	MS	F
Between Groups	0.06	4	0.01	5.14 **
Within Groups	0.40	141	0.00	
Total	0.46	145		

In the present study it was observed that endurance ability of 12 to 14 years of age boys were more or less same. But after that 15 and 16 years age group boys had taken less time than the 12, 13 and 14 years. 16 years boys showed better performance than other groups. So it can conclude that 16 years boys were better than 15 years and 15 years boys were better than 12, 13 and 14 years boys. Lower the score higher was the performance.

Table-15: - Comparisons of paired means of 600 yd. Run & walk

Age	13	14	15	16
12	0.006 ^{N.S}	0.003 ^{N.S}	0.037 ^{**}	0.047 ^{**}
13		0.002 ^{N.S}	0.036 ^{**}	0.046 ^{**}
14			0.033 [*]	0.043 ^{**}
15				0.010 ^{N.S}

Slaughter et al. (1982) has shown that the average 600 yard run performance in seconds of 9.0-9.9, 10.0-10.9 and 11.0-11.9 years old American boys were 154.7, 157.8 and 142.9 seconds respectively. Comparing to the present study it is clear that the American boys were better than that of Bengali boys. In the present study it was observed that from 12 to 14 years of age endurance ability remains same but after that it improves.

CONCLUSIONS:**Shuttle Run**

- 13 years boys group were more agile than all other groups. Major increment in agility was during the maximum spurt in height and weight, i.e., between 12-13 years boys.
- Five groups were significantly different from each other in Shuttle run performance.

Standing Broad Jump

- Higher the age, higher was the leg explosive strength except 14 years boys group. Maximum spurt were observed in 13 years group.
- Mean difference between the groups in respect of standing broad jump was highly significant. Jumping ability of the groups may be arranged as 16>15>13>14>12.

50mt. Run

- The scores of performance in 50mt run among the five groups were statistically significant.
- 16 years boys were better in 50mt. run performance than other groups. The rapid increase were also found in 13 years age groups boys. This increase in speed ability of boys may due to rapid improvement of leg explosive strength and movement frequency. Therefore, 50mt. run of the groups may be arranged as 16>15>13>14>12.

Wall Pass

- Wall pass performance score was related to the age of the subjects. Higher the age, higher was the wall pass score except 14 years. Better score was observed in 13 and 16 years group boys.
- Mean scores of Wall pass were statistically different. Groups may be placed as 16>14>15>13>12.

600 Yard Run and Walk

- Better endurance performance was observed in 16 years groups.
- Significant mean differences were observed among five means.

RECOMMENDATIONS:

1. The present study was delimited only to male students; the same type of study may be made with female students.
2. Similar investigation may be done using different growth and motor performance parameters other than those used in the study. Psychological and Physiological parameters which were not considered in the present study.
3. Similar study may be conducted on large samples and age groups other than those used in the study.
4. A comparative study can be undertaken using the same parameters of Indian and foreign subjects.
5. Similar study may be done using tribal and non tribal boys and girls.
6. An interested researcher may prepare norms on height and weight for various age group boys on the basis of valid tests, on boys and girls of each district of West Bengal for proper evaluation.

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