Physical and Motor Fitness Level of Secondary School-Going Boys

Yeasir Arafat[1], Jannatul Ferdaus Rickta[2], Fatima Tus Johora Mukta[2], Rezaul Islam[3]

[1]Physical Education Department, Chittagong University of Engineering and Technology, Chittagong, Bangladesh

[2]Physical Education & Sports Science, Jashore University of Science and Technology, Jashore, Bangladesh

[3]Physical Education Department, Bangabandhu Textile Engineering College, Tangial, Bangladesh

Email address:
arafat4232@cuet.ac.bd (Yeasir Arafat), jannat121216@gmail.com (Jannatul Ferdaus Rickta),
fatimatuzjohoramukta@gmail.com (Fatima Tus Johora Mukta), reza7392.rk@gmail.com (Rezaul Islam)

Abstract: Motor fitness is a part of physical fitness which indicates the ability of an individual to do some motor task or movement activity. The purpose of the present study is to identify the physical and motor fitness level of secondary school-going boys concerning some standard norms. A total number of 200 school-going boys equally distributed from classes six, seven, eight, nine, and ten were selected as subjects for the study. The components- for determining acceleration and speed 50m dash, 4×10m shuttle run for speed and agility, standing broad jump for the explosive power of the legs, 1 minute sit up for endurance of the abdominal and hip-flexor muscles, and finally, 800m run for basic endurance. All of the tests flowed as standard procedure. The collected data were analyzed using appropriate statistical techniques. The results and within the limitation of the study, the acceleration, speed, agility, explosive power, the endurance of abdominal and hip-flexor muscles and finally basic endurance of the school-going boys increases with the increase of class six to class ten.

Keywords: Motor Fitness, Components, Standard Norms, Acceleration, Increasing

1. Introduction

There is a lot of scientific evidence to demonstrate that physical fitness reduces the risk of morbidity and mortality from several chronic diseases [1, 4, 8]. Fitness is understood as the ability to do some work. It is a total concept for human beings and it is composed of many-sided components like physical fitness, mental fitness, social fitness, intellectual fitness, and so on. Physical fitness is a part of total fitness. It indicates the ability of an individual to do some physical work. Physical fitness mainly depends on the organic function of the body [5]. So, physical fitness is also considered physiological or organic fitness. Motor fitness is a part of physical fitness [6]. It indicates the ability of an individual to do some motor task or movement activity.

Motor Fitness according to Barrow is "a readiness or preparedness with special regard for big muscle activity without undue fatigue" [7, 9]. Motor fitness has many components like speed, strength, endurance, agility, flexibility, balance, coordination, etc. This is also referred to as neuromuscular coordination [2].

It is not possible to measure motor fitness by a single test because motor fitness involves several components of different nature. Generally, motor fitness is measured by measuring different components using different tests [10]. Thus, total motor fitness is measured by using different motor fitness tests. This combined form of motor fitness test is called a motor fitness test battery. There is renowned motor fitness batteries composed of different motor fitness tests [11].

AAHPERD YOUTH FITNESS TEST battery is composed of six tests- pull-ups, standing broad jump, sit-ups, a 50-yard run, and 600-yard run and walk, shuttle run, similarly, barrow motor ability test battery is composed of tests like standing broad jump, jig-jag run, medicine ball part.

Motor fitness depends on many factors some of them are the practice of movement activities, age, sex, nutrition, etc

[12]. There have been many research works to study motor fitness, concerning age, sex and other influencing factors. The present study was also a similar work with the purpose of analyzing the change in motor fitness for schoolboys.

It is therefore the responsibility of every country to promote the physical fitness of its citizen because physical fitness is the basic requirement for most of the tasks to be undertaken by an individual in his daily life. An unfit citizen is a burden on society. Good health and physical fitness is required for all the professions such as students, doctors, engineers, scientists, politicians as well as sportspersons [3, 13]. There is a dearth of reference values for physical fitness including motor fitness for secondary school children in Bangladesh [4, 14]. The purpose of the present study is to identify the fitness level of secondary-level school-going boys concerning some standard norms.

2. Materials and Methods

A total of 200 schoolboys equally distributed from classes six, seven, eight, nine and ten were selected as subjects for the study. They were from two schools in the district of Magura, Bangladesh. They were mostly from lower to middle-income groups of families.

Motor fitness was measured by measuring some of its components- to determine acceleration and speed 50m dash, 4×10m shuttle run for speed and agility, standing broad jump for the explosive power of the legs, 1minute sit up for endurance of the abdominal and hip-flexor muscles and finally, 800m run for basic endurance. All of the tests were flowed as standard procedure. The tests were conducted on the natural grass surface.

Some equipment and tools were used for collecting data in the present study. Weighting machine to measure body weight, Tape for measuring distance and height, Stopwatch for measuring time, two wooden blocks for conducting shuttle run test, Jumping pit for conducting standing broad jump, other materials like a whistle, cone, rope etc.

The collected data were analyzed using appropriate statistical techniques. The mean was calculated as the measure of central tendency. Standard deviation was calculated as the measure of variability. The significance of the difference between the two means was calculated using the 'T'-test.

The mean is calculated as a measure of central tendency by using the formula:

$$\overline{X} = \frac{\sum X}{N}$$

The standard deviation (SD) is calculated as the measure of variability by using the formula:

$$SD\ (\sigma) = \sqrt{\frac{(X - \overline{X})^2}{N}}$$

Significance of the difference between two mean values was tested using σ t test. The formula used for t-test

$$t = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

Mean and standard deviation of different groups of subjects in different motor fitness components have been presented in Table 1:

Mean and standard deviation of different groups of subjects in different motor fitness components.

***Table 1.** Mean and standard deviation of different groups of subjects in different motor fitness components.*

Groups	50 m. Dash(s)	Standing Broad jump (cm)	4×10 m Shuttle Run (s)	800 m Run(s)	Sit Up
Class six	8.53 ± 0.74	1.92 ± 0.19	11.87 ±1.66	555.23 ±55.90	12.98 ±4.20
Class seven	8.10 ± 0.28	2.03 ± 0.13	11.22 ±0.74	575.20 ±26.08	14.13 ± 4.50
Class eight	7.03 ± 0.35	2.16 ± 0.19	10.55 ± 0.57	364.85 ±92.13	17.18 ±4.40
Class nine	7.28 ± 0.45	2.20 ± 0.15	10.51 ± 0.53	338.05 ±87.65	23.35 ± 6.42
Class ten	7.23 ± 0.46	2.26 ±0.20	10.47 ±0.74	311.78 ±90.30	23.13 ±6.12

2.1. 50m Dash

It is seen from the table 1, that the meantime for 50m dash of class six was 8.53 seconds and this value decreased for class seven, class eight, class nine and class ten boys students. This indicates that the speed gradually improves from class seven to class ten.

Standing Broad Jump

The mean distance of Standing Broad Jump of class six and this value increased for class seven to class eight, class nine and class ten boys students. This indicates that's the leg explosive strength increased from class seven to class ten.

2.2. 4×10m Shuttle Run

The mean time of the shuttle run of class six was 11.87 seconds and this value decreased for class seven to class ten.

This indicates that the agility improves from class seven to class ten.

2.3. 800m Run

The mean time of 800m run of class six was 555.23 seconds and this value improved for class seven, but decreased for class eight to class nine. This indicates that the basic endurance decreased for class seven, but increased for class eight to class ten.

2.4. Sit Up

The mean number of sit-ups of class six was 12.98 and this value increased from class seven to class ten. This indicates that the abdominal muscular strength endurance increased from class seven to class ten.

The mean values of different parameters of different

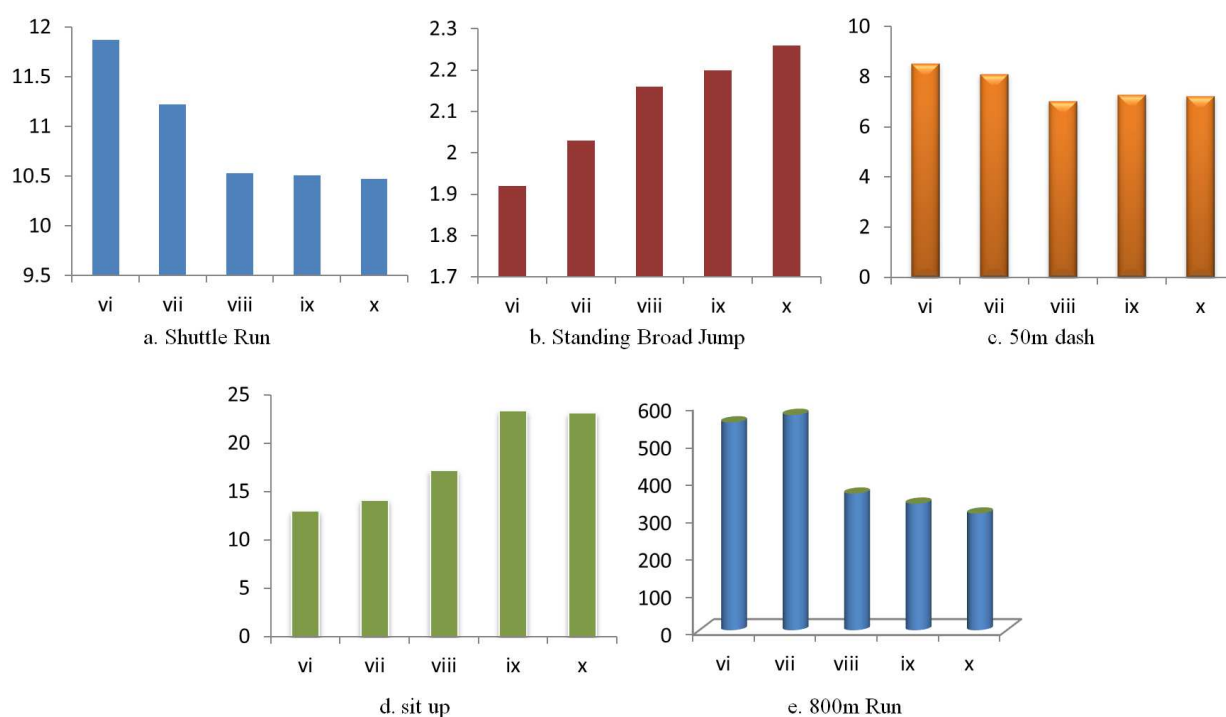groups of subjects have been presented in figure 1:

Figure 1. (a-e): Mean values of different groups of subjects in different motor fitness components.

It is seen from the table values that the mean performance in different motor fitness components changed from class to class. In order to test the significance of the change in each motor fitness component t-test was used.

The result of t-test for 50m dash has been shown in Table 2.

Table 2. 't' Value for 50m dash.

Mean value of the group					Mean difference	't' value	Remarks
Six	Seven	Eight	Nine	Ten			
8.53	8.10				0.43	3.44	Significance
	8.10	7.03			1.07	15.13	Significance
		7.03	7.28		0.25	2.78	Significance
			7.28	7.23	0.05	0.70	Not significance

It is seen from the table that the t-value was more than the required table value at 0.05 levels for degrees of freedom 78 for the difference between class six to class seven, class seven to class eight and class eight to class nine. In other cases, the difference was not significant. Therefore it was understood that the performance of 50m dash of class seven was significantly better than class six. In the same way, class eight was better than class seven and class nine was better than class eight.

The result of t-test for standing broad jump has been shown in Table 3.

Table 3. 't' Value for Standing Broad jump.

Mean value of the group					Mean difference	't' value	Remarks
Six	Seven	Eight	Nine	Ten			
1.92	2.03				0.11	3.02	Significance
	2.03	2.16			0.13	3.02	Significance
		2.16	2.20		0.04	0.17	Not significance
			2.20	2.26	0.06	0.24	Not significance

It is seen from the table that the t-value was more than the required table value at 0.05 levels for degrees of freedom 78 for the difference between class six to class seven and class seven to class eight. In other cases, the difference was not significant. Therefore it was understood that the performance of standing broad jump in class seven was significantly better than in class six. In the same way, class eight was better than class seven.

The result of t-test for shuttle run has been shown in Table 4.

Table 4. *'t' Value for Shuttle Run.*

Mean value of the group					Mean difference	't' value	Remarks
Six	Seven	Eight	Nine	Ten			
11.87	11.22				0.65	2.27	Significance
	11.22	10.53			0.69	0.74	Not significance
		10.53	10.51		0.02	0.03	Not significance
			10.51	10.47	0.04	0.04	Not significance

It is seen from the table that the t-value was more than the required table value at 0.05 levels for degrees of freedom 78 for the difference between class six and class seven. In other cases, the difference was not significant. Therefore it was understood that the performance of the shuttle run of class seven was significantly better than class six.

The result of t-test for 800m run has been shown in Table 5.

Table 5. *'t' Value for 800m Run.*

Mean value of the group					Mean difference	't' value	Remarks
Six	Seven	Eight	Nine	Ten			
555.23	575.20				19.97	2.05	Significance
	575.20	364.85			210.35	13.89	Significance
		364.85	338.05		26.80	1.33	Not significance
			338.05	311.78	26.27	1.32	Not significance

It is seen from the table that the t-value was more than the required table value at 0.05 levels for degrees of freedom 78 for the difference between class six to class seven and class seven to class eight. In other cases, the difference was not significant. Therefore it was understood that the performance of the 800m run of class seven was significantly better than class six and class eight was better than class seven.

The result of t-test for sit up has been shown in Table 6.

Table 6. *'t' Value for Sit Up.*

Mean value of the group					Mean difference	't' value	Remarks
Six	Seven	Eight	Nine	Ten			
12.98	14.13				1.15	1.18	Not significance
	14.13	17.18			3.05	3.07	Significance
		17.18	23.35		6.17	5.02	Significance
			23.35	23.13	0.22	0.16	Not significance

It is seen from the table that the t-value was more than the required table value at 0.05 levels for degrees of freedom 78 for the difference between class seven to class eight and class eight to class nine. In other cases, the difference was not significant. Therefore it was understood that the performance of sit-ups of class eight was significantly better than class seven. In the same way, class nine was better than class eight.

3. Discussion

The results obtained are given information about the use of discriminatory functions in the classification of students by [16]. A previous study indicate that motor development is positively related to successful academic achievement, supporting previously provided evidence about positive relationship between cognitive and motor developmental trajectories [17]. Accordingly, highly developed motor abilities may facilitate cognitive function in children and contribute to better academic achievement, which is confirmed by other studies [18, 19]. Another study declares that there was no significant difference between Indian and Bangladeshi adolescent or school-going boys because of the climatic condition, altitude, food habits, environmental conditions, living style, body structure, social, cultural and psychological conditions of both the two countries are almost the same [3].

Physical Fitness or motor fitness depends on many factors such as Physique, Climatic condition, Altitude, Nutrition, internal and external Environment, Living style Psychological make-up, etc [3]. In speed, the performance significantly increased from class six to class seven, class seven to class eight and class eight to class nine. In standing broad jump, the performance significantly improved from class six to class seven and class seven to class eight. In the shuttle run, the performance significantly increased from class six to class seven. In sit-ups, the performance significantly increased from class seven to class eight and class eight to class nine. In 800m run, the performance significantly increased from class six to class seven and class seven to class eight.

4. Conclusions

On the basis of the results and within the limitation of the study, the speed of the school-going boys increases with the increase of class six to class ten. The leg power of school-going boys increases class to class from class six to class eight. The agility of school-going boys increases from class six to class seven. Only there after it does not show increasing train. The abdominal muscular strength of school-going boys increases from class seven to class eight and class

eight to class nine. The basic endurance of school-going boys increases from class six to class seven and class seven to class eight.

Competing Interests

There are no competing interests declared by the authors.

Acknowledgements

References

[1] Tuarth J. H Biddle, Trish Gorely and David J. Stensel (2004). Health-enhancing physical activity and sedentary behavior in children and adolescents, Journal of Sports Sciences; 22, 679–701.

[2] Arafat, Y., Rickta, J. F., & Mukta, F. T. J. (2020). A comparative study of motor fitness between sprinter and long-distance runner in Bangladesh. International Journal of Yoga, Physiotherapy and Physical Education, 22.

[3] Dr. Md. Nasim Reza (2018). A comparative study of physical fitness between adolescent boys of Bangladesh and India. International Journal of Yoga, Physiotherapy and Physical Education; 3 (2); 87-91.

[4] K. S. H. M. V. W. W. Senevirathne (2021). A study to develop motor fitness reference values of secondary school children in Sri Lanka, International Journal of Research and Innovation in Social Science (IJRISS); 5 (3), 445-449.

[5] Arafat, Y., Rickta, J. F., & Mukta, F. T. J. (2020). Difference between selected movement parameters in Straight and Curve path among national level players in Bangladesh.

[6] Arafat, M. Y., Rickta, J. F., & Mukta, F. T. J. (2020). Analysis of ball velocity for different groups of positional soccer players. International Journal of Physical Education Sports Management and Yogic Sciences, 10 (4), 19-24.

[7] Reza, M. N., & Chodhury, M. R. Changes in Power and Strength-Endurance in Progression of Age from 6 to 8 Years Boys. *Int. J. Phy. Edu. Spo*, *4* (04), 01-07.

[8] Rickta, J. F., Arafat, M. Y., & Mukta, F. T. J. (2021). A study on correlation among physique, motor fitness and performance of soccer player. International Journal of Physical Education Sports Management and Yogic Sciences, 11 (1), 28-33.

[9] Barrow, H. M. (1983). *Man and movement: Principles of physical education*. Lea & Febiger.

[10] Mandal, D., & Biswas, A. K. (2020). A Study On Stride Length In Initial Acceleration Phase For Tribal And Non-Tribal School Boys. *European Journal of Physical Education and Sport Science*, *6* (7).

[11] Baker DW, Parker RM, Williams MV, Pitkin K, Parikh NS, Coates W, Imara M. (1996). The health care experience of patients with low literacy. Archives of Family Medicine. 5 (6): 329–334.

[12] Pratt, C. (2007). Ancient civilization of human race. New York, New York Rosen Publishing Group.

[13] Flores G, Laws MB, Mayo SJ, Zuckerman B, Abreu M, Medina L, Hardt EJ (2003). Errors in medical interpretation and their potential clinical consequences in pediatric encounters. Pediatrics. 111 (1): 6–14.

[14] Grossman M, Kaestner R. (1997). The effects of education on health. In: The Social Benefits of Education. Behermean R, editor; Stacey N, editor., Editors. Ann Arbor, MI: University of Michigan Press; 69–123.

[15] Hausman A. (2001). Taking your medicine: Relational steps to improving patient compliance. Health Marketing Quarterly. 19 (2): 49–71.

[16] Khudolii, O. M., Iermakov, S. S., & Prusik, K. (2015). Classification of motor fitness of 7-9 years old boys. Journal of Physical Education and Sport, 15 (2), 245.

[17] Batez, M., Milošević, Ž., Mikulić, I., Sporiš, G., Mačak, D., & Trajković, N. (2021). Relationship between motor competence, physical fitness, and academic achievement in young school-aged children. BioMed Research International, 2021.

[18] Magistro, D., Bardaglio, G., & Rabaglietti, E. (2015). Gross motor skills and academic achievement in typically developing children: The mediating effect of ADHD related behaviours. Cognitie, Creier, Comportament/Cognition, Brain, Behavior, 19 (2).

[19] Piek, J. P., Dawson, L., Smith, L. M., & Gasson, N. (2008). The role of early fine and gross motor development on later motor and cognitive ability. Human movement science, 27 (5), 668-681.