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An investigation on relationship between physical performance and academic achievement in male adolescents

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Abstract

Regular participating in physical activity, sports and such allied activities has innumerable benefits during adolescents. Leisure time pursuits should be physically demanding and mentally soothing. Adolescence is important stage of life wherein an individual's personality gets shaped. The child tries too hard to prove itself in the competitive world. Adolescence is a period of physical, psychological, emotional and personality change, which can lead to stress, and emotional and Behavioral problems. The Indian adolescents are no exception to this. Parents and peer pressure has been too much for the adolescents to push themselves hard in academics. The overwhelming focus on educational endeavors is usually at the cost of leisure time pursuits. The research evidence suggests that there is a relationship between academic achievement and physical fitness. Further, it is well established that there is a strong association between physical performance and academic achievement. This paper is an attempt to explore the influence of physical performance on academic achievement. To achieve the purpose of the study necessary data was collected from 635 subjects of high schools in Karnataka during 2016-17. Hand grip strength was used as a proxy for physical performance among school students. Standardized paper pencil tests were used to assess academic achievement. Apart from descriptive statistics Pearson product moment correlation coefficient was calculated using SPSS. The findings are discussed in detail. On the basis of the results of the present study it has been concluded that there was significantly positive linear relationship of handgrip strength with academic achievement in adolescent boys of Karnataka.

Keywords: Adolescent, physical performance, hand grip strength, academic achievement

1. Introduction

Regular participating in physical activity, sports and such allied activities has innumerable benefits during adolescents. Leisure time pursuits should be physically demanding and mentally soothing. Huge academic pressure places tremendous demand on the adolescents. To cope with such stresses, being physically active is very important. Physically active child demonstrates higher physical, mental and emotional capacities as compared to its inactive counterpart (Ruiz, *et al.*, (2010) ^[2]).

Adolescence is important stage of life wherein an individual's personality gets shaped. The child strives to prove itself in the competitive world. Academic achievement is the first priority during this period. The child engages academic pursuits at the cost of being physically active. A strong positive correlation between academic achievement and physical performance is repeatedly established among almost all population (Kundu and Tutoo, 2004) ^[3].

The Indian adolescents are no exception to this. Parents and peer pressure has been too much for the adolescents to push themselves hard in academics. The overwhelming focus on educational endeavors is usually at the cost of leisure time pursuits. The research evidence suggests that there is a relationship between academic achievement and physical fitness. Further, it is well established that there is a strong association between physical performance and academic achievement (Gajanana, Ramesh and Ajay, 2016) ^[1]. In this pretext, an attempt has been made in the present study to establish relationship between physical performance and various other aspects related to adolescents.

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2. Materials and Methods

2.1 Selection of subjects

To achieve the purpose of the study necessary data was collected from 597 subjects of high schools boys in Karnataka during 2016-17. The subjects selected from various schools of Bengaluru and Mysuru divisions were studying in 9th standard and their age ranged between 14 to 16 years.

2.2 Selection of test items

Assessment of physical performance through handgrip strength: Dominant hand grip strength was used for assessing physical performance among school students. Grip strength was measured by the help of an analogue hand grip dynamometer. Before taking the measurement, the subjects were requested to sit in a comfortable position. They were asked to squeeze the dynamometer as hard as possible without moving the body. Thus, the final grip strength was measured for both hands and the reading was taken from the dynamometer scale when the pointer no longer moved. Three trials were given to each subject and the best reading was the score of the subjects.

Assessment of academic achievement: The investigator constructed a knowledge test with standard procedure for assessment of academic achievement in adolescent students. The test included 50 questions from General Science (N=17), Social Science (N=16) and Mathematics (N=17) subjects of eighth standard. The duly constructed test was standardized using Item Analysis and Item Discrimination procedures.

Procedure: The researcher along with a trained helper collected necessary data related to the present investigation in a class room set up. The researcher personally visited within Bangalore and Mysore educational divisions of Karnataka State. The selected subjects of ninth standard were requested to assemble in a particular class room for data collection. Objectives of the tests were made clear to the subjects at the outset. The researcher oriented the subjects regarding the procedure of all the tests to be conducted. An informed written consent was received from each subject to ensure their willingness to take part in the study as subjects. Honest responses were sought from the subjects and doubts were timely clarified. Each written test tool took no more than 20 minutes each.

The filled in questionnaire was received by the subjects for intended analysis of data. Handgrip strength was assessed individually with three non-consecutive trials each. Data was analyzed using the SPSS 21.0 statistical package. Firstly, descriptive tests including mean and standard deviation were calculated to determine the nature of the data. In order to test the duly formulated hypotheses Pearson product moment correlation coefficients were assessed and multiple regression analysis were carried out. This helped in eliciting association of physical performance with academic achievement.

3. Results and Discussion

The descriptive statistics on handgrip strength and academic achievement of adolescent boys in Karnataka given in Table 1.

Table 1: Results on handgrip strength and academic achievement of adolescent boys

	Rural	Urban	Kannada Medium	English Medium	Overall
Handgrip strength	26.67±6.25	26.73±6.69	26.13±6.41	27.96±6.50	26.71±6.49
Academic Achievement	21.80±5.17	22.58±6.17	21.73±5.07	23.31±6.88	22.22±5.74

Table 1 on handgrip strength and academic achievement of adolescent boys makes it clear that the results are normally distributed with acceptable homogeneity. Results on

relationship between physical performance and academic achievement of adolescent boys are provided in Table 2.

Table 2: Summary of Pearson product moment correlation coefficient regarding relationship between handgrip strength and academic achievement of adolescent boys

			Handgrip strength	Academic Achievement
Rural	Handgrip strength	Pearson Correlation	1	.109
		Sig. (2-tailed)		.072
		N	274	274
Urban	Handgrip strength	Pearson Correlation	1	.148**
		Sig. (2-tailed)		.008
		N	323	323
Kannada	Handgrip strength	Pearson Correlation	1	.039
		Sig. (2-tailed)		.435
		N	410	410
English	Handgrip strength	Pearson Correlation	1	.246**
		Sig. (2-tailed)		.001
		N	187	187
Overall	Handgrip strength	Pearson Correlation	1	.132**
		Sig. (2-tailed)		.001
		N	597	597

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

From Table 2 it is evident that there is Not significant linear relationship between handgrip strength and academic achievement (.109) in rural boys; significant positive linear relationship between handgrip strength and academic achievement (.148)** in urban boys; Not significant linear relationship between handgrip strength and academic

achievement (.039) in Kannada medium boys; significant positive linear relationship between handgrip strength and academic achievement (.246)** in English medium boys; and significant positive linear relationship between handgrip strength and academic achievement (.132)** in overall adolescent boys of Karnataka.

It has been observed that the rural boys demonstrate academic achievement as they possess higher grip strength. The boys who engage in physical activities and sports in rural setting for keeping themselves fit can considerably was not significant of academic achievement. In urban setting a significant positive correlation between hand grip strength and academic achievement. The results make it clear that the boys who engage in physical activities can score higher grades in academic endeavors. Interestingly, there was significant positive linear relationship between physical performance and academic achievement in urban boys. Kannada medium boys tend to have Physical performance was not significantly related with academic achievement, as we know under privileged and UN privileged boys now a day's attend Kannada medium schools. English medium boys are immensely benefitted by keeping themselves physically fit. Hand grip strength showed significant positive association with academic achievement in English medium boys. Overall it was observed that the physical performance measured in terms of hand grip strength has significantly positive relationship with academic achievement. This means that the boys are benefitted from physical activities and sports in order to gain higher academic scores.

There was a significant difference in grip strength for boys in all age groups between 4 and 15 years in a study by Ploegmakers, *et al.* (2013) ^[4]. Fitness was strongly and significantly related to academic performance in another study on associations of physical fitness and academic performance among schoolchildren (Van Dusen *et al.* 2011) ^[5]. Study by So (2012) concluded that moderate physical activity was positively correlated with academic performance in boys. The male students who did not participate in regular physical activity showed higher score compared to participants in regular physical activity (Kwon, Oh and Yang, 2016). According to Li, Lu and Wang (2009) ^[6] participation in PA might be an effective way to improve the physical, psychological, as well as academic of college students.

4. Conclusions

On the basis of the study present study in boys section it was concluded that the physical performance was positively related to academic achievement in urban setup as well as English medium and overall adolescent boys. In adolescent boys of Karnataka.

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