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Musculoskeletal fitness in the 13 year old girls: A comparative study between government and public schools of Delhi

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Abstract
The purpose of the study was to compare the status of musculoskeletal fitness in 13 year old girls of government and public school of Delhi. For the purpose of the study a total number of 700 (350 from Government and 350 Public Schools) school going girls of Delhi were selected on two phase sampling. In the first phase we used random sampling for selection of schools from different zones and in the second phase purposive sampling for collecting data from those schools who volunteered to participate in the study. The variables selected for the study were musculoskeletal fitness components namely muscular strength, muscular endurance, and flexibility. A prior consent was obtained from the subjects by the research scholar for conducting the study. The data was analyzed by calculating a detailed descriptive statistics and to compare the mean difference between government and public school girls on musculoskeletal fitness components, 't' test was employed at 0.05 level of significance. The result of the study indicates a significant difference obtained in flexibility in the 13 year old girls of government and public schools of Delhi. However, there were no significant differences obtained in muscular strength and endurance.

Keywords: musculoskeletal fitness, flexibility, muscular strength and muscular endurance

Introduction

In the last decade, the level of physical fitness in children has been decreasing and the levels of obesity have increased (World Health Organization, 2009; Slinger, 2005), probably because the levels of physical activity participation by the school children is not sufficient to promote an ideal health (Koutedakis &Bouziotas, 2003). Physical inactivity significantly contributes to childhood overweight and obesity. With growing academic pressure, many of the schools tend to sacrifice physical education class from their daily schedule in order to enhance academic achievement. The consensus that regular daily physical activity is important for health is underpinned by the national and international health authorities recommendations that children and adolescents should accumulate at least 60 minutes of daily moderate to vigorous intensive physical activity (Centres for Disease Control and Prevention, 2012, WHO, 2010). A child's physical performance is dependent on age, sex, socioeconomic class and the level of sports activities in kindergarten and elementary school (Krombholz H, 1997). There appears to be a positive association between physical activity and academic performance and classroom behaviour, attention and enhanced health related fitness in children (Dwyer JJ *et al*., 2003, Morgan PJ, Hansen V, 2008, Trost SG, *et al*., 2008). Overwhelming evidence demonstrates that improved health related fitness, that includes measures of body composition (body mass index, waist circumference, skin folds), cardio-respiratory fitness and musculoskeletal fitness (muscular strength and endurance and flexibility), is associated with improved health in children and youth(Janssen I, 2007, Strong WB, Malina RM, *et al*., 2005, Anderssen SA, *et al*., 2007, Ekelund U *et al*., 2007).The improvement of cardiovascular endurance especially, has been equated with the improvement of health status or disease prevention (Haskel, WL, 1985). There are some physiological adaptations such as increased glycolytic enzyme activity and oxidative enzymes that probably contributes to such improvements (Fournir M *et al*, 1982, Ferreira LF *et al*., 2005, Bruce CR *et al*., 2006). Biological maturity is a determining and prominent agent of physiological responses to physical activity and exercises. Anatomical and physiological changes of organisms are involved in biological puberty. Each of the progressive structural or functional changes is an indicator for measuring biological maturity but the pattern of growth curves can be also different for anatomical and physiological variables

Musculoskeletal fitness is no less important from health point of view. Maintaining adequate muscular strength and flexibility enables the muscles to contract forcefully over a period of time and to have a full range of motion at the joint. Muscle imbalance at a specific joint quite often results in musculoskeletal injuries. Testing of the musculoskeletal fitness of the abdominal/ trunk region proves to be necessary as it relates to the activities of daily living, maintaining correct posture and proper functioning of the back.

To the authors' knowledge, no study has assessed the status of musculoskeletal fitness in 13 year old school girls of government and public schools of Delhi. Hence forth, the present study reflects a genuine approach to increase moderate physical activity participation in children for enhancing their quality of life. Hence, the study was undertaken with the

purpose of the study was to assess the musculoskeletal fitness in the 13 year old girls: A comparative study between government and public schools of Delhi.

Methodology

Sample

For the purpose of the present study, 700 (government N-350 and public schools N-350) 13 year old girls of Delhi were selected on two phase sampling, in first phase we use random sampling for selection of schools from different zones and then purposive sampling for collecting data from those schools who permit for data collection. The research scholar obtained prior consent from the subject for the purpose of the study. The requirement of the study was explained to all of them and all agreed voluntarily to undergo the testing programme.

Criterion Measures

The following criterion measures were considered for the purpose of the study:

a. Muscular strength measured by flexed arm hang test.
b. Muscular endurance measured by sit up test.
c. Flexibility measured by sit and reach test.

Statistical Analysis

To find out the mean and standard deviation for the selected variables, descriptive statistics was employed and‘t’ test was employed at 0.05 level, to find out the difference between government and public schools girls of Delhi on musculoskeletal fitness component (muscular strength, muscular endurance, and flexibility).

Findings & Discussions

The data was analyzed by employing descriptive statistics and‘t’ test. The calculations were performed using the SPSS 21.0 software and the findings pertaining to descriptive statistics and ‘t’ test between government and public Delhi school girls of 13 year on Musculoskeletal fitness component (muscular strength, muscular endurance, and flexibility) were shown in table 1.

Table 1: Mean, Standard Deviation and‘t’ values of Musculoskeletal fitness components in 13 year old Girls of Government and Public Schools of Delhi

Variables	Schools	Mean ± S.D.	‘t’ Value	Sig.
Muscular Strength (Flexed Arm Hang)	Government	1.88± 2.38 sec	1.592	0.112
	Public	2.20± 2.90 sec		
Muscular Endurance (Sit Ups)	Government	15.46± 7.22	0.250	0.803
	Public	13.92± 7.74		
Flexibility (Sit and Reach)	Government	29.55± 7.37 cms	2.369*	0.009
	Public	29.41± 7.45 cms		

*Significant at 0.001 level

It is clearly seen in table 1 that the 13 year old girls studying in government school and private schools have different musculo-skeletal fitness. The 13 year old girls studying in public schools have higher muscular strength as compared to government school girls. While, the muscular endurance and flexibility was found higher among 13 year old government school girls as compared to the public school girls. This difference was significant for flexibility while for muscular strength and endurance the differences were found insignificant.

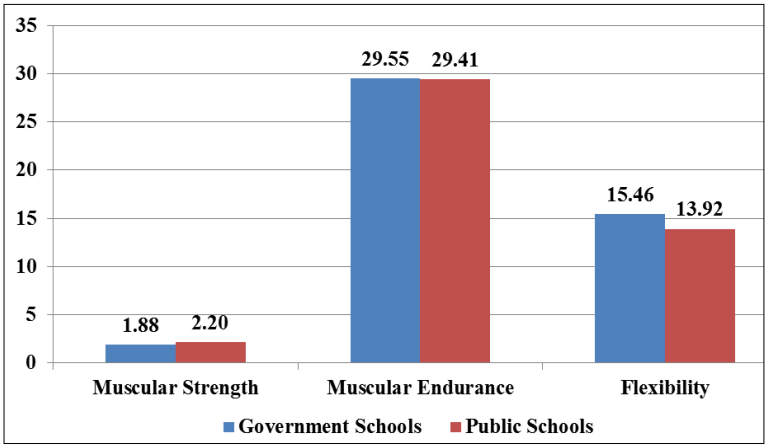

Fig 1: Mean Value of 13 year old girls of Government and Public Schools for all Musculoskeletal Fitness.

Musculo-Skeletal and physical fitness performance are, in part, related to body size and maturity status (Malina *et al*. 2004). Strength, endurance and flexibility of the muscles are important in activities of daily living, maintaining functional health and promoting good posture. It is equally important to have strong muscles that can work forcefully and over a period of time and to be flexible enough to have a full range of motion at the joint.

Conclusions

Based on the findings of the study it was concluded that there exists a difference in musculo-skeletal fitness between 13 year old girls studying in government and public schools with muscular endurance and flexibility was found higher among government schools girls and muscular strength was found higher among public school girls. This difference was found significant in flexibility only while the differences were found insignificant for muscular strength and endurance.

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