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COMPARATIVE STUDY OF PHYSICAL FITNESS PARAMETERS AMONG 12 YEARS OLD RURAL AND URBAN CHILDREN

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Abstract:

Background: The environmental factors lead to changes in the physical fitness level among children. The objective of the present study was to compare the physical fitness parameters of the rural and urban children from Punjab.

Methods: Total 60 children (30 rural and 30 urban) 12 years old were selected to participate in the study. All the subjects were measured for various physical fitness parameters. The speed ability was measured with the help of 30 meter sprint (Flying Start). The endurance of the rural and urban children was assessed with the help of 800 meter run. Sit and reach test was used to assess the flexibility of the children. The standing broad jump and standing vertical jump were applied to measure the explosive strength. The grip strength was measured with the help of hand dynamometer. The medicine ball put was used to measure the strength of arms.

Results: The independent samples t-test revealed that the rural children were found to have significantly greater speed ($p<0.05$), standing broad jump ($p<0.05$), grip strength of both left ($p<0.05$) and right ($p<0.05$) hand than the urban children.

Conclusions: It can be concluded that the rural children were better in some physical fitness parameters.

Keywords: physical fitness, rural, urban, children, strength

1. Introduction

Physical fitness is an essential indicator of the health of children and adolescents and also a good predictor of health in later life. It is most indispensable in the modern

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society due to the impact of globalization and technological advancements leading to better lifestyle (Shivakumar et al, 2014). The thought of physical fitness is as old as human race. All the way through the history of mankind, physical fitness has been regarded as an important aspect of everyday life. The people in ancient times were mostly reliant upon their personal strength and energy for survival (Gill et al, 2010). It included the mastery of a number of fundamental skills such as strength, speed, stamina, agility for running, jumping, climbing and other skills used in search for their livelihood.

Residing in places distinguished by size of population can be linked with variations in eating attitudes, availability of sports facilities, accessibility of health services and opportunities for physical fitness activities (Tsimeas et al, 2005). About 70 percent of Indian population lives in villages. There is a large variation among urban and rural areas in India. One of the most important differences that can be noticed between rural and urban areas is the dissimilarity in living standard of the people. People living in urban areas have better standard of living. There is a huge economic inequality between rural and urban areas in India. There are many people who prefer the peace and quiet of rural living. Rural areas are not as densely populated, not as polluted and certainly not as fast paced as the urban areas. Rural areas have a fresher and cleaner environment.

As it is established fact that physical fitness during childhood has imported health consequences in later periods of life (Sallis et al, 1992), several studies on physical fitness of children have been conducted in different parts of the world. Childhood and adolescent are very important periods of life, since many physiological and psychological changes take place at these ages (Amusa et al, 2011). Similarly, lifestyles and behaviors are shaped during these stages of life which may influence health and behavior in the adulthood. The low levels of physical fitness has been related with the impaired health indicators such as cardiovascular disease risk factors (Buchheit et al, 2007; Thomas et al, 2003), increased body fat (Dencker et al, 2006), abdominal adiposity (Ortega et al, 2007; Brunet et al, 2007) and hypertension (Katzmarzyk et al, 2001; Ruiz et al, 2006). As the risks of unfitness and obesity are cumulative, starting from the childhood to the latter half of life (Eriksson et al, 2003), this condition is particularly distressing for the future public health. Data on physical fitness among children from Mexico (Pena Reyes et al, 2003), Canada (Blinski et al, 2005), Greece (Tsimeas et al, 2005; Tambalis et al, 2010), Turkey (Ozdirenc et al, 2005), Spain (Casajus et al, 2007; Chillon et al, 2011), Taiwan (Chen et al, 2008; Wang et al, 2013), Malasia (Hian et al, 2013) are available in the literature. All these reports made the importance of the contribution of physical fitness in the development of strong body and healthy

lifestyle. Given that fitness is an essential component of health (Eisenmann et al, 2005), examining the physical fitness levels of children could be useful for interventions to improve physical fitness among the children. The present study, therefore, aims to evaluate the physical fitness parameters of the rural and urban children.

2. Methodology

The subjects of the present study were purposively selected from the various camps conducted under "Catch Them Young Programme" organized by Department of Physical Education (AT), Guru Nanak Dev University, Amritsar under the aegis of Centre of excellence in sports sciences. A total sixty children of age 12 years from the rural and urban areas were selected as subjected. Out of sixty children, 30 children were belonged to rural areas and 30 children were from the urban areas. In different studies and countries, the meaning and definition of rural and urban residence may differ according to their country norms. For the present study, an area with a minimum population of 15,000, with 75 percent of the male population is engaged in non-agricultural works is considered as urban area.

2.1 Physical Fitness

All the subjects were assessed for various physical fitness components. The various components of physical fitness were measured using the following tests:

A. 30 Meter Sprint (Flying Start)

In this test, 45 meter distance was divided into two zones of 15 meters and the other of 30 meters. The subject started the sprint from starting line and accelerated and as soon as he completed the first zone of 15 meters, the timing was initiated. The time taken to complete the second zone of 30 meters was the time of test and recorded to the nearest 0.1 sec.

B. 800 Meter Run

This test is used to check the endurance of subjects. The aim of the test is to complete 800 meter run in quickest possible time. To start the test, all subjects lineup behind the starting line. On the command 'go' the clock was started and subjects begun running. The total time to run 800 meters was recorded at the finishing line.

C. Sit and Reach Test

The sit and reach test is used to measure the flexibility. The subject was asked to sit on the floor with legs stretched without shoes. The feet of the subjects were placed against the box. Subjects were asked to stretch forward along the measuring line on the box as far as possible with palms facing downwards and keeping knees straight. The subjects

were asked to hold this position at least for two seconds and the distance was recorded in centimeters.

D. Standing Broad Jump

To measure the leg extension explosive strength, the jumping performance was analyzed. The subject was asked to jump for maximum distance from a standing position and was instructed to bend his knees, putting his arms in front of him, and jump forward as possible, trying to land on his feet. Two attempts were given for better result of the test and noted in centimeters.

E. Standing Vertical Jump

It tested the explosive strength of legs. The subject was asked to dip his hand in chalk powder and stood alongside the wall. The subject was asked to clap the extended hand marked with chalk to mark the standing reach. Then he jumped as high as possible and touched the wall. The score was the best of three jumps in centimeters by subtracting standing reach from the jumping height.

F. Medicine Ball Put

This test was used to measure explosive strength of arms. The test involved throwing a 2 kg medicine ball in the horizontal direction as far as possible from a sitting position. The subject was asked to sit on floor with straight legs and throw the ball from chest outwards. Two attempts were given to each subject and the best distance measured in meters was the score of the test.

G. Grip Strength

The grip strength of the subjects was measured with the help of hand dynamometer. While holding the dynamometer in their hand the subjects were asked to squeeze it powerfully. The subjects were required to crush gradually and uninterruptedly for at least two seconds. The grip strength of both right and left hand of the subjects was measured separately. The subjects were given two attempts for the each hand. The best among the two attempts was the score of the test recorded in kilograms.

H. Statistical Analysis

Statistical analysis was performed using SPSS version 16.0 for windows (SPSS Inc, Chicago, IL, USA). All descriptive data pertaining to physical fitness variables was reported as mean and standard deviation. An independent sample t-test was used to compare the mean values of physical fitness variables between rural and urban children. Significance levels were set at $p<0.05$.

3. Results

Table 1: Comparison of physical fitness components of the rural and urban boys

Variables	Rural (N=180)		Urban (N=180)		t-value
	Mean	SD	Mean	SD	
Speed (sec)	4.44	0.43	5.37	0.55	7.23*
Medicine Ball Put (m)	2.48	0.62	2.41	0.39	0.52
Flexibility (cm)	8.93	4.91	7.93	2.53	0.99
Endurance (min)	4.10	0.37	4.31	0.67	1.50
Standing Vertical Jump (cm)	27.70	4.90	25.43	5.76	1.64
Standing Broad Jump (cm)	161.56	18.93	144.50	13.21	4.04*
Grip Strength Left (kg)	22.13	6.40	18.06	3.62	3.02*
Grip Strength Right (kg)	22.53	7.01	18.26	4.51	2.80*

* Indicates $p<0.05$

The physical fitness variables of the rural and urban boys are presented in table 1. As shown in the table, the rural boys were found to have significantly better speed ($t = 7.23$, $p < 0.05$) as compared to urban boys. There was no significant difference in performance in medicine ball put, flexibility, endurance and standing vertical jump between the rural and urban boys. The rural boys were found to have significantly better standing broad jump ($t = 4.04$, $p < 0.05$) as compared to urban boys. Rural boys were also found to have significantly better grip strength of left hand ($t = 3.02$, $p < 0.05$) and right hand ($t = 2.80$, $p < 0.05$) as compared to urban boys.

4. Discussion

The principle aim of the current study was to examine potential differences in physical fitness of Punjabi boys living in either urban or rural settings. The results of presents study showed that the rural boys had performed significantly better in speed, standing broad jump and grip strength as compared to urban boys. The present data agreed with the published reports advocating that the place of residence has an impact on children's fitness. Specifically it has been found that US, Brazilian, Croatian, Ecuadorian and Mexican urban children have superior fitness levels compared to those in rural areas (McMurray et al. 1999; Pena Reyes et al. 2003; Mazzuco et al. 2006; Ujevic et al, 2013; Andrade et al, 2014) whereas reports from Poland, Turkey and Bengal proposed that rural children were fitter than their urban counterparts (Wilczewski et al. 1996; Ozdirenc et al, 2005; Saha and Haldar, 2012; Das and Chatterjee, 2013). However,

Tsimeas et al (2005) reported mixed results on Greek children regarding physical fitness as urban children were better in vertical jump and basketball throw and rural children were better in hand grip strength. While comparing the physical fitness variables between the rural and urban boys in 12 years old age group, it was observed that the rural boys had significantly better speed as compared to urban boys. The rural boys also had significantly greater standing broad jump and grip strength than their urban counterparts. These results are in agreement with those on Greek children (Tsimeas et al, 2005) but in contrast with the results reported by Pena Reyes et al (2003) on children from Turkey. The data for boys in the present study showed greater values for grip strength than the Saudi Arabia boys studied by Al-Hazzaa (1990) and lower values than the Greek children reported by Tsimeas et al (2005). On the other hand, no significant differences were reported in performance of endurance. These results are not in line with those of Pena Reyes et al (2003) who reported that urban children had better endurance than rural children in Turkey.

Such research reports may be due to the fact that the difference between rural and urban areas are diminishing because of facilities which were available in urban areas are now being provided in rural areas also in terms of gymnasium, transport, connectivity with other towns and cities and better health facilities and other opportunities. But as the results of the present study showed that rural children were better in physical fitness than the urban children, it might be due to more activity oriented routine in rural areas, engagement in agriculture related work, more open spaces and play fields compared to cities, clean air etc in the rural areas of Punjab.

5. Conclusions

The environmental factors lead to changes in the physical fitness level among children. The place of residence also has effects on physical fitness parameters of the children. The rural children showed significantly better scores on physical fitness parameters (speed, standing broad jump and grip strength) than the urban children.

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