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Study of physical fitness among rural and urban children from Punjab

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Abstract

The purpose of the present study was to evaluate and compare the physical fitness of the rural and urban children from Punjab. Total 360 children (180 rural and 180 urban) of age between 12 to 17 years were selected to participate in the study. All the subjects were measured for various physical fitness components. The speed of the children was measured with the help of 30 meter sprint (Flying Start). The endurance of the 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. The results revealed that the rural children were found to have significantly better speed ($p < 0.01$), endurance ($p < 0.01$), standing broad jump ($p < 0.01$), standing vertical jump ($p < 0.05$), medicine ball put ($p < 0.01$), grip strength of both left ($p < 0.01$) and right ($p < 0.01$) hand than the urban children. In conclusion, it is evident from the results that place of residence had impact on the physical fitness components among the children.

Keywords: Physical Fitness, Rural, Urban, Children, Strength.

Introduction

The urbanization process takes place in various countries under different circumstances in recent times [34]. Due to globalization and growing economic growth, many countries are rapidly undergoing important demographic, epidemiological and nutrition transitions. Urbanization and increasing income have a great impact on health and well being [26, 14, 23] due in part to change in dietary and physical activity patterns [25, 4]. The transition from rural agricultural societies to urban societies, which come with major changes, have forced to a large extent the social and biological transformation of populations throughout the world [9]. The differences in growth, body dimensions, body composition and fitness levels of children due to urban and rural environmental disparities have come into center of attention during the last few years.

The environmental factors lead to changes in the physical fitness level among children. The impact of socioeconomic status, ethnicity and area of residence (urban or rural) has been reported on the level of physical fitness among children, with no consistent patterns emerging [11]. [28] observed that greater physical fitness of children had a significant relationship with larger living space and residing in rural areas. Rural area is generally linked to a more strenuous, physically dynamic way of life that is advantageous to physical fitness. On the other hand, changes in lifestyle due to living in urban settings may also affect physical fitness. Environmental and social changes related to living in urban areas such as crowding, changing neighborhood, safety worries and inadequate grounds for play may possibly contribute to lower level of physical fitness among children [24]. Similar studies also reported which showing the significance of living area as a determinant of physical fitness in children [5, 30]. Differences in physical fitness levels of children from different socio-economic groups and rural and urban areas reported in developed and developing countries. Contradictory studies have been published on physical fitness components of urban and rural children [13, 36, 20, 29].

In some cases, there were no significant differences in physical fitness between urban and rural children [17]. While some studies reported that the urban children have superior physical fitness compared to children from rural areas [20, 24, 19, 13] other studies reported contradictory findings [36, 23, 27, 10,]

Reports suggested that the physical fitness of children across rural and urban environments should be studied in different climatic, economic and cultural perspectives [11].

Investigation of the physical fitness of children living in hastily developing urban areas and in rural areas in various countries is potentially of importance [11].

Area of residence and environmental factors may be related to the disparities in activity patterns, diet, eating attitudes, availability of sports facilities and chances for physical fitness activities. However, it is not clear whether such factors can affect physical fitness. The present study, therefore, aims to evaluate the physical fitness among the rural and urban children of state of Punjab.

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 three hundred and sixty male children, aged 12-17 years, from the various districts of Punjab were selected to participate in the study. The boys were from Amritsar, Jalandhar, Tarn-taran, Kapurthala, Nawashehar and Gurdaspur districts of Punjab. Out of three hundred and sixty male children, 180 children were belonged to rural areas and 180 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.

Physical Fitness

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

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.

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.

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.

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.

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.

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.

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.

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 $p < 0.05$.

Results

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

Variables	Rural (N=180)		Urban (N=180)		t-Value
	Mean	SD	Mean	SD	
Speed (sec)	4.56	0.48	4.96	0.59	6.89**
Medicine Ball Put (m)	3.37	0.93	2.95	0.75	4.63**
Flexibility (cm)	9.52	6.34	8.63	4.84	1.50
Endurance (min)	3.55	0.53	4.01	0.55	2.81**
Standing Vertical Jump (cm)	31.67	6.92	30.15	6.76	2.10*
Standing Broad Jump (cm)	178.76	25.89	159.77	28.85	6.57**
Grip Strength Left (kg)	30.37	9.53	25.77	8.47	4.83**
Grip Strength Right (kg)	31.06	9.47	26.07	8.67	5.20**

* Indicates $p < 0.05$, ** Indicates $p < 0.01$

The table 1 depicts the physical fitness characteristics of the rural and urban children. The results revealed that the rural children were found to have significantly better performance in speed ($t = 6.89, p < 0.01$) and medicine ball put ($t = 4.63, p < 0.01$) as compared to urban children. There was no significant difference in performance of flexibility between the rural and urban children. The rural children were found to have significantly better performance in endurance ($t = 2.81, p < 0.01$), standing vertical jump ($t = 2.10, p < 0.05$) and standing broad jump ($t = 6.57, p < 0.01$) as compared to their urban counterparts. Similarly, rural children had significantly better grip strength in both right ($t = 5.20, p < 0.01$) and left ($t = 4.83, p < 0.01$) hands as compared to urban children.

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 present study showed that the rural children had performed significantly better in almost all the physical fitness variables as compared to urban children. 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 [21, 24, 19, 33, 1] whereas reports from Poland, Turkey and Bengal proposed that rural children were fitter than their urban counterparts [36, 23, 27, 10]. Matsui and Tamura [18] demonstrated that the children from rural areas had better endurance ability than the children in urban areas from Japan, while [15] reported that the children from rural areas in South Africa were found to have significantly lower grip strength than urban children, but no significant differences were reported among rural and urban children in neuromuscular reaction time and pulse rate. [12] investigated a large number of 3 to 18 years old children in Hungary and observed that urban environment had beneficial effects on the physical fitness and children from urban areas were performed better in fitness tests. The children from rural areas in Tswana had superior endurance performance but lower grip strength than the children from urban areas [7, 8]. The rural children in Mexico were found to have superior handgrip strength whereas explosive power, muscle endurance and strength were superior in children from urban areas when adjustments for age and body size were made [24]. The children from urban areas in Greece had significantly higher performance in basketball throw and vertical jump compared to their rural counterparts, whereas the rural children had significantly greater handgrip strength compared to urban children [31]. McNaughton *et al.* [22] reported that the Tasmanian boys and girls had greater aerobic fitness than their rural counterparts, whereas motor skills were similar among urban and rural children in New South Wales, Australia [3]. The rural children in Turkey were found to have significantly superior flexibility and muscular endurance than their urban counterparts [23]. The height and weight are positively correlated with distance in girls and it advocated that the rural girls having proportionately greater body dimensions had superior physical performance [2]. Chillon *et al.* [6] found that the rural Spanish children had superior cardio-respiratory fitness and upper and lower-limb muscular fitness but inferior speed and flexibility. Hian *et al.* [16] reported that the rural Malaysian children were performed better in fitness tests compared to urban children. The rural children in Taiwan performed better in bent-leg curl-ups and standing long jump

than the urban boys [35]. However, Tsimeas *et al.* [31] 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. 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 this has not yet happened in India. There is still a marked difference in rural and urban areas in Punjab. But as the results of the present study showed that rural children were better in anthropometric characteristics and 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.

Conclusion

It is concluded that the place of residence has clear impact on physical fitness of children as studied herein. The rural children performed significantly better on the physical fitness tests as compared to the urban children. The way of life, activity levels, food habits and the constituents of food might have played significant role in the differences among children from different settings.

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