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## Influence of sports clubs in developing physical fitness of youth belong to rural area

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### Abstract

**Introduction:** Cross-sectional studies detected associations between physical fitness, living area, and sports participation in children. Yet, their scientific value is limited because the identification of cause-and-effect relationships is not possible. In a longitudinal approach, this study examined the effects of living area and sports club participation on physical fitness development in the youth between the age group of 18-25.

**Methods & Materials:** One-hundred and fifty (age: 18–25 years; sex: 150 boys) were tested for their physical fitness (i.e., endurance [12 min run], speed [50 m sprint], lower- [standing broad jump] and upper-extremity muscle strength [shot put], flexibility [stand-and-reach], and coordination [shuttle run]). Living area (i.e., urban / rural) and sports club participation were assessed using questionnaire.

**Results:** Over the one year study period, urban compared to rural community showed significantly better performance development for upper- ( $p=0.009$ ,  $ES=0.16$ ) and lower-extremity strength ( $p<0.001$ ,  $ES=0.22$ ). Further, significantly better performance development were found for endurance ( $p=0.08$ ,  $ES=0.19$ ) and lower-extremity strength ( $p=0.024$ ,  $ES=0.23$ ) for the youth continuously participating in sports clubs compared to their non-participating peers.

**Conclusions:** This study findings suggest that sport club programs with appealing arrangements appear to represent a good means to promote physical fitness in children living in rural areas.

**Keywords:** sports clubs, physical fitness, rural area

### Introduction

Physical fitness is an important health determinant that is related to several physiological functions. Recent studies regarding the health burden of chronic diseases revealed significant inverse associations between physical fitness and various cardiovascular risk factors (e.g., blood pressure, insulin resistance, cholesterol/lipids, and overweight/adiposity) in children and adolescents. Further, there is evidence that physical fitness and its health-related outcomes track from childhood over adolescence into adulthood. In fact, findings from longitudinal studies indicate that higher levels of physical fitness during childhood and adolescence are associated with a healthier cardiovascular profile in adulthood.

Besides the subcategory living area, sports participation represents another factor that is related to physical fitness. For example, Ara *et al.* reported significantly better scores for lower-extremity muscle strength (squat jump), endurance (20-m shuttle run), and speed (sprint tests over 30 and 300 m) in boys (8–11 years) participating in a sport club as compared to their non-participating classmates

Therefore, this study used a longitudinal approach and aimed at investigating differences in physical fitness levels of youth living in urban as compared to rural areas and between sports club participating subjects and their non-participating peers. Based on the available literature, it is hypothesized that physical fitness level and its development is better in youth living in rural compared to urban areas. In addition, it is expected that persons continuously participating in sports clubs show better physical fitness levels as well as larger fitness development rates than their non-participating peers.

### Materials and Methods

A longitudinal study was conducted to test changes in physical fitness in the same subjects over time (i.e., 18-25).

The participating youth belong to government and aided colleges of the University of Kerala, that were randomly selected from urban and rural areas of the southern part of Kerala.

### Anthropometry

Body height was measured without shoes to the nearest 0.5 cm with a wall-mounted stadiometer. Body weight was determined in light clothing and without shoes to the nearest 100 g with an electronic scale. Body mass index (BMI) was calculated using body weight divided by height squared ( $\text{kg}/\text{m}^2$ ).

### Physical fitness testing

Physical fitness was determined with 6 different tests from motor fitness test batteries in the same subjects in every three months. The tests included the following items: 50-m sprint, shot put, standing broad jump, stand-and-reach, shuttle run, and 12 min. run. All tests were performed in the respective college/university gyms following standardized test protocols (e.g., test instructions).

### Questionnaire

Subjects were advised to fill a questionnaire, which contained information regarding the subcategories living area (rural or urban) and sports club participation (Yes or No option). Subjects who are not intended to change their residential status ( $N=150$ ; urban:  $n=75$ , rural:  $n=75$ ) over the one year study period were included for further analyses. Sixty out of those 150 subjects either continuously participated ( $n=44$ ) or did not participate ( $n=16$ ) in a sports club at all. The remaining ninety subjects changed their status of sports club participation from 'Yes' to 'No' or vice versa over the period of study and were therefore not included in the analysis.

### Statistical analyses

Data are presented as group mean values and standard deviations. Physical fitness parameters were analyzed with Analyses of Variance (ANOVA) with repeated measures on class. Adjusted post-hoc tests were conducted to identify the comparisons that were statistically significant. The classification of effect size ( $ES$ ) was determined as small, medium and large. In addition, the chi-square test was also used to determine associations between living area and sports club participation. The significance level was set at  $p < 0.05$ . All analyses were performed using Statistical Package for the Social Sciences (SPSS).

### Results

Anthropometric and physical fitness test data of the study sample are presented. Seventy five subjects lived in an urban and seventy five subjects belong to rural community. Over the one year experimental period, 44 subjects continuously participated in a sports club at least once in a week while 16 students did not participate in a sports club during the whole study period. Thirty urban students and fourteen rural students continuously participated in a sports club. The correlative analysis regarding living area and sports club participation revealed that living in rural areas is more likely associated with not participating in a sports club ( $n=16$ ) compared to living in urban areas ( $n=44$ ). The number of practiced sports significantly differed ( $p < 0.001$ ) between urban (i.e., 22 different sports) and rural (i.e., 12 different sports) population.

**Table 1:** Effect of living area on physical fitness in the youth

Main/interaction effect	F-value	df	p-value	Partial $\eta^2$	ES
50-m sprint	5.8	1	0.017	0.033	0.18
Shot put	2.8	1	0.099	0.016	0.13
Standing broad jump	3.4	1	0.066	0.020	0.14
Stand and reach	0.0	1	0.855	0.000	0.00
Shuttle run	0.4	1	0.534	0.002	0.04
12-min Run	2.4	1	0.127	0.014	0.12

Development of physical fitness in 150 youth of Kerala with respect to the living area (urban:  $n=75$ , rural:  $n=75$ ): (a) 50-m sprint, (b) shot put, (c) standing broad jump, (d) stand-and-reach, (e) shuttle run, and (f) 12-min run. ( $p < 0.05$ ) and † ( $p < 0.01$ ) indicate that performance was significantly better in urban than in rural children; for the 50-m sprint and the shuttle run, lower scores indicate better performance; for the shot put, the standing broad jump, the stand-and-reach, and the 12-min run, higher scores indicate better performance. The main effect of living area was significant for the 50-m sprint test ( $F_{[1, 170]} = 5.8$ ,  $p = 0.017$ ,  $\eta^2 = 0.033$ ,  $ES = 0.18$ ). Post-hoc analyses indicated significantly better performances in 4 out of 6 physical fitness tests (i.e., 50-m sprint, shot put, standing broad jump, 12-min run) in favor of subjects living in urban compared to rural areas.

**Table 2:** Effect of club participation on physical fitness in the youth

Main/interaction effect	F-value	df	p-value	Partial $\eta^2$	ES
50-m sprint	10.8	1	0.002	0.148	0.42
Shot put	4.9	1	0.030	0.074	0.28
Standing broad jump	5.2	1	0.026	0.078	0.29
Sit and reach	11.9	1	0.001	0.162	0.44
Shuttle run	6.8	1	0.012	0.098	0.33
12-min run	1.9	1	0.173	0.030	0.18

Development of physical fitness in 60 youth ( $n=44$ ,  $n=16$ ) according sports club participation, (a) 50-m sprint, (b) shot put, (c) standing broad jump, (d) stand-and-reach, (e) shuttle run, and (f) 12-min run. ( $p < 0.05$ ), † ( $p < 0.01$ ), and ‡ ( $p < 0.001$ ) indicate that performance was significantly better in youth with sports club participation than without continuous sports club participation; for the 50-m sprint and the shuttle run, lower scores indicate better performance; for the shot put, the standing broad jump, the stand-and-reach, and the 12-min run, higher scores indicate better performance. The main effect of sports club participation turned out to be significant (all  $p \leq 0.030$ ,  $ES = 0.28-0.44$ ) in all except 12-min run. Post-hoc analyses indicated significantly better performances in all physical fitness tests for the subjects participating in sport clubs compared to those who did not.

### Discussion

The main findings can be summarized as follows: (1) over the one year period of study, youth living in urban as compared to rural areas showed a significantly better performance development for upper (shot put) and lower-extremity muscle strength (standing broad jump) and (2) the youth participating in sport clubs showed a significantly better performance development over the period of one year for measures of endurance (12-min run) and lower-extremity muscle strength (standing broad jump) as compared to their non-participating peers.

### **Living area and the development of physical fitness**

In addition to the already existing cross-sectional studies, the present investigation provided data originating from a longitudinal study approach over a period of one year experimental period. As a result, it was found that living area has a positive effect on the development of physical fitness in children in terms of significantly better performance increments for the youth living in urban compared to rural areas. This was detected in significant findings for upper- (shot put) and lower-extremity muscle strength (standing broad jump).

It is of interest to note that our results regarding better physical fitness in urban as compared to rural children are in contrast to most of the studies reported in the literature.

### **Sports club participation and the development of physical fitness**

The results of this study illustrated that, irrespective of living area, subjects participating in sports clubs showed better physical fitness development than their non-participating peers. The findings of our longitudinal approach are in accordance with that of cross-sectional studies concerning a positive association of sports club participation and physical fitness.

This study finding regarding better physical fitness development in sports club participating persons may be attributed to the formal and structured organizational frame in which physical activity takes place.

### **Conclusion**

Findings from the present study indicate that the development of physical fitness is positively affected by living area and sports club participation. More specifically, youth living in urban areas and participating in sports clubs are fitter and fitness progressed faster than in their counterparts in terms of endurance (12-min run), upper- (shot put) and lower-extremity muscle strength (standing broad jump). It is inferred that sports club programs offering appealing arrangements could be a good means to increase physical fitness in youth living in rural areas.

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