

## PHYSICAL FITNESS : A COMPARATIVE STUDY BETWEEN STUDENTS OF RESIDENTIAL (SAINIK) AND NON-RESIDENTIAL SCHOOLS (AGED 12-14 YEARS)

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**Abstract :** Physical Fitness Index (PFI), of fifty Residential (Sainik) School children (Mean  $\pm$  SD, 13.18  $\pm$  0.48 yrs) and forty four Non-Residential school children (Mean  $\pm$  SD, 13.15  $\pm$  0.66 yrs) of Bijapur, Karnataka, was assessed by Harvard Step Test. Their height (cm), weight (kg), chest circumference (cm), and mid arm circumference (cm) were recorded as physical anthropometry. Body Mass Index (BMI) was also calculated ( $\text{kg}/\text{m}^2$ ). Results indicated that Non-Residential School children had poor physical anthropometry and showed a less PFI score (Mean  $\pm$  SD, 60.56  $\pm$  13.49), as compared to Residential (Sainik) School children (Mean  $\pm$  SD, 85.7  $\pm$  16.91). Regular physical activity with uniform diet and better physical composition attributed higher physical fitness in the children of Residential (Sainik) school in comparison to their sedentary Non-Residential counter part.

**Key words :** residential non-residential physical fitness  
(Sainik) school school index (PFI)  
children children

### INTRODUCTION

Physical fitness acquired in youth provides healthy impact on cardiorespiratory system (1). It is well known that several factors like heredity, environment, diet, socioeconomic status and training contribute to performance of an individual (2). Physical fitness level of an individual depends on the amount of oxygen which can be transported by the body to working muscles, and the efficiency of muscles to use that oxygen (3). Among

the various tool to evaluate physical fitness, Harvard Step Test is considered very much reliable measure in field study (4). To find out physical fitness index among the school children the method of Harvard Step Test has been recommended by American Alliance for Health, Physical Education, Recreation and Dance (AAPHERD) (5) and routinely included in various health programme (6). Data on physical fitness of school going children has been reported by several investigators through out the world (7-8).

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However to our knowledge, there is no comparative study on physical fitness of a Residential (Sainik) and a Non-Residential School Children of Karnataka. Hence, the present study was conducted to evaluate physical fitness index (PFI) of Residential (Sainik) and Non-Residential school children of Bijapur, Karnataka, in relation to their physical anthropometry.

### METHODS

Ninety four (94) school children volunteered for the study. Fifty (50) of them were from Residential (Sainik) School, Bijapur. Remaining Forty four (44) were from a Non-Residential day school of Bijapur. Students of eighth standard (age 12-14 yrs) were included in the present study. This was done keeping in mind the age of entry to sainik school (sixth standard), so that all sainik school children gets minimum of two years exposure to sainik school environment. Students with any known respiratory, neuromuscular, cardiac or endocrine disorder were not included in the study. Ethical clearance committee of BLDEA's Sri. B.M. Patil Medical College approved protocol of the study.

The height (cm), body weight (kg), chest circumference (cm) and mid-arm circumference (cm) were recorded as physical anthropometry. Body mass index (BMI) was calculated ( $\text{kg}/\text{m}^2$ ). The resting heart rate (b.p.m.) and blood pressure (mmHg) were recorded too.

Physical fitness was measured by using Harvard Step Test (9). Each subject completed 'up' and 'down' task (24 steps per

minute) on an 18-inch bench for 3 minutes or until exhaustion whichever is early. Exhaustion is defined as when the children could not maintain the stepping rate for 15 per second. The physical fitness index (PFI) score was calculated as follows :

$$\text{PFI} = \frac{\text{Duration of exercise in seconds} \times 100}{5.5 \times \text{Pulse count (1-1.30 minute after exercise)}}$$

The mean and standard deviation of mean (SD) of various parameters between Residential (Sainik) and Non-Residential group were calculated and their tests for significance were applied by using unpaired 't' test (10).

### RESULTS

Table I shows the anthropometrical characteristics of the school going children from Residential (Sainik) and Non-Residential school. Results depict that height, weight, mid arm circumference and chest circumference are significantly higher in Residential (Sainik) School children as compared to Non-Residential school children. However, the BMI has not differed significantly between Residential (Sainik) and Non-Residential groups.

The resting heart rate and blood pressure of children of both the groups were within normal range (Table II).

The mean physical fitness index (PFI) of the children of both the schools are shown in Fig. 1. It is observed that mean PFI score of Residential (Sainik) school children is significantly higher ( $P < 0.001$ ) than Non-Residential school children.



TABLE I: Anthropometrical parameters in Residential (Sainik) and Nonresidential school children.

Characteristics	Residential (Sainik) n = 50	Nonresidential n = 44	'P' value
Age, (yr.)	13.18±0.477	13.15±0.66	P>0.05
Height, (cm)	150.66±8.04	139.70±9.27	P<0.001
Weight, (kg)	37.04±5.25	32.22±5.03	P<0.001
B.M.I., (kg/m <sup>2</sup> )	16.22±1.01	16.26±0.51	P>0.05
Chest circumference (cm)	69.56±4.99	63.34±4.78	P<0.001
Mid arm circumference (cm)	21.28±2.32	18.75±2.28	P<0.001

Values are mean ± S.D., B.M.I.; Body mass index.

TABLE II: Physiological parameters in Residential (Sainik) and Nonresidential school children.

Characteristics	Residential (Sainik) n = 50	Nonresidential n = 44	'P' value
HR (bpm)/resting	77.88±4.08	79.90±2.48	NS
SBP (mm Hg)/resting	111.32±6.68	111.24±8.24	NS
DBP (mm Hg)/resting	71.76±6.90	79.90±2.48	P<0.01

Values are mean ± S.D., HR, Heart rate; bpm, beat per minute; SBP, Systolic blood pressure; DBP, Diastolic blood pressure.

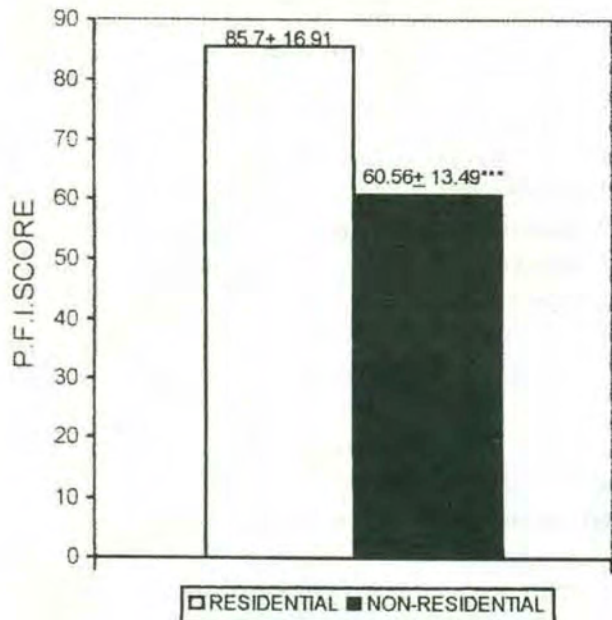


Fig. 1: The mean ± S.D. of Physical Fitness Index Score (P.F.I.) of Residential (Sainik) and Non-Residential school children of Bijapur.

\*\*\*P<0.001

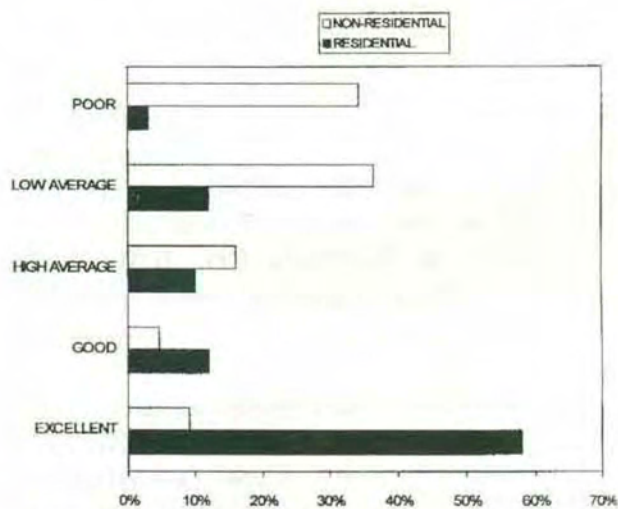


Fig. 2: Percentage distribution of Residential (Sainik) and Non-Residential school children of Bijapur in various fitness Categories according to their PFI. Excellent >90; Good 80-90; High Average 65-79; Low Average 55-64 and Poor<55.

Percentage of various categories of fitness between Non-Residential and Residential (Sainik) school children depicted



in Fig. 2, shows that most of sainik school children belong to Excellent group, whereas, most of Non-Residential school children belong to either Low average or Poor group.

### DISCUSSION

Results of our study showed that the children of Residential (Sainik) school have a higher physical fitness than their counter part of Non-Residential day school. This may be attributed to less physical activity and sedentary life style in Non-Residential, Non-sainik school children (11). It is known that a regular physical training protocol is strictly maintained in sainik schools, while there was no such regular routine co-curricular activity in Non-Residential schools. Studies have shown that children who engage in regular endurance training have better physical fitness than children who are more sedentary (12).

Our study has also revealed that children of two schools are in two extreme groups of classification of physical fitness index. About 60% of Residential (sainik) school children are in Excellent category, while about 70% of Non-Residential school children are in either Low average or Poor category. The poor physical fitness of the children of Non-Residential school of Bijapur in comparison to their Residential (Sainik) school counterpart may

be due to poor physical composition, improper nutritional status and lack of physical activity in them (13). This is supported by our observation that the students of Non-Residential school have poor physical anthropometry. Moreover, children of residential (sainik) school receive a uniform balanced diet and takes part in regular physical exercise.

Regular physical exercise is necessary for proper growth of an individual as it increases plasma somatotropin level (14), which is essential for proper growth of individual (15). In order to have uniform physical fitness among school children in same age group, it is advisable to formulate a regular physical training schedule, so that, they can achieve better strength and endurance.

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