

Original Research Article

Relationship between Body Mass Index (BMI) and Physical Fitness in School Going Children in Deccan, Pune

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ABSTRACT

Background: Childhood fitness is an emerging area of concern as prevalence of childhood obesity is rising. Excess body weight in childhood and adolescence is associated with higher risk of premature death and disability in adulthood. India also faces a major problem of underweight. Underweight children are more prone to malnutrition and undernutrition. Hence our study was undertaken to find out the relationship between BMI and fitness in school going children.

Type of study: Cross-sectional study.

Method: 235 school going children of age group 8-11 years were selected purposively in the study from various schools in Pune. Their height, weight and BMI were noted. President's fitness challenge (partial curl ups, shuttle run, v sit and reach, endurance run and walk and right-angle push ups) were administered to all the students.

Statistical analysis: Spearman's correlation test was used to find the correlation between BMI and physical fitness.

Results: Very weak negative correlation was established between BMI and curl ups (r value -0.12) v sit and reach (r value -0.002) endurance run (r value -0.07) right angle push ups (r value -0.15) and very weak positive correlation was established between BMI and shuttle run (r value 0.08).

Conclusion: The study concludes that basic levels of physical fitness in school going children are low.

Key words: Childhood obesity, Childhood undernutrition, BMI, Physical fitness.

INTRODUCTION

Fitness is a general term used to describe the ability to perform physical work. [1] It includes following components: Health related components like cardiorespiratory endurance, Muscular endurance, Muscular Strength, Flexibility, Body composition and Skill Related components like Agility, Balance, Co-ordination, Power, Speed. Childhood fitness is an emerging area of concern as prevalence of childhood obesity is rising, main reason being sedentary lifestyle, high

calorie intake, rise of indoor games like video games, television, etc. [2] Excess bodyweight in childhood and adolescence is associated with higher risk of premature death and disability in adulthood, but overweight children are also more likely to develop non-communicable diseases such as diabetes at young age. [3] International Association for Study of Obesity (IASO) and International Obesity Task Force (IOTF) estimate that 200 million school going children are either overweight or obese. [4]

Prevalence of obesity among school going children in India has been reported to be high in Punjab approximately 20.7% and Lowest in South India 15.1%. [5] India also faces a major problem of underweight, where 44% of children are underweight. Around 50% of the underweight children are found in Uttar Pradesh, Madhya Pradesh (60%), Jharkhand (56.5%), Bihar (55.9%) and Tamil Nadu (25%). [5] Underweight children are more prone to malnutrition, undernutrition, etc. So, the need of the hour is to examine the burden of undernutrition and obesity. [5] Hence our study aims to find out the relationship between BMI and Fitness in school going children.

MATERIALS AND METHODOLOGY

Materials used were pen, paper, weighing machine, CDC charts, stadiometer, yoga mat, timer, wooden blocks, chalk, scale.

INCLUSION CRITERIA: Children of the age group 8-11 years of age. Both the genders were included.

EXCLUSION CRITERIA: Known neurological disease. Fracture or musculoskeletal injury. Undergone recent surgery. Any injury or disease. Acute or any congenital illness.

PROCEDURE: Permission was taken from our Principal, Institutional Ethical Committee and from the Principals of the selected schools. Informed and written consent was taken from the parents of the students after explaining the purpose of the study. 235 students were included purposively from various schools in Pune. Height, Weight and BMI of the subjects was noted and President's fitness tests were administered to every student. **Partial curl ups:** Student lied flat on the ground with arms extended, hip knee flexion with toes pointing forward, a line was marked below the knees and they had to come up so as their fingers crossed the line. They had to repeat the procedure for a minute and numbers of curl ups were noted. **Shuttle run:** 2 parallel lines were drawn 30 feet apart, student was instructed to run from behind

the line, had to pick up the object placed from behind the opposite line and keep the object behind the starting line, run back to the finish line, cross it and pick another object and cross the starting line and keep the second object. Time for the run was recorded. **V sit and reach:** 2 feet line was marked on the floor a perpendicular at its centre was marked and the line was extended, measuring tape was placed along the perpendicular to note the readings, student was made to sit on the perpendicular with feet 8-12 inches apart, thumbs were clasped with palms facing downwards and student was asked to reach as forward as possible without bending knees. 3 trials were done and the fourth one was recorded. **Endurance run and walk:** Two parallel lines were marked one mile apart; students were instructed to run or walk and reach the finish line in minimum time possible. For 8-9-year olds distance was ½ mile. Time was measured for the same. **Right angle push ups:** Subject lied facing down on the mat in push up position with palms facing downwards, hands under the shoulders, legs straight with feet slightly apart with toes supporting the feet, arms were straightened by keeping back and knees straight and elbow was flexed till a 90-degree angle was obtained at elbows, helper marked the 90-degree level and the student comes back up. They had to repeat this for a minute and numbers of push ups were noted.

STATISTICAL ANALYSIS: Statistical Analysis was done using the statistics software INSTAT 3.0. Spearman's Correlation Test was used to find the correlation between BMI and Partial curl ups, Shuttle run, V sit and reach, Endurance run and walk and Right angle pushups.

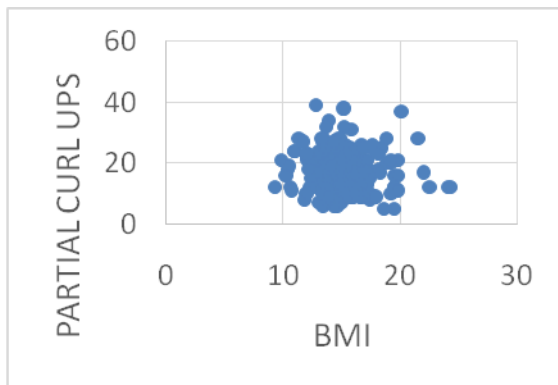
RESULTS

235 primary school going students studying in 1st - 4th standard were sampled. Out of which 18 students had normal BMI and 217 were underweight. Most of them had BMI between 18-18.5 and very few had very low BMI. 84 students belonged to

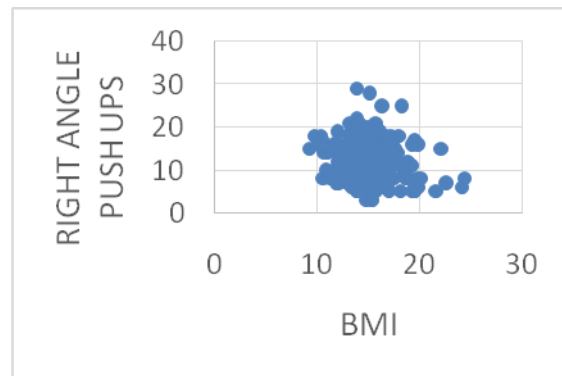
sports background (including girls) 53 students reported going for some sports activities for 2-3 hours and others twice or thrice in a week for 3 hours. These students

belonged in BMI range between 18-25 and very few also belonged in the underweight category. Characteristic features of the samples are given below:

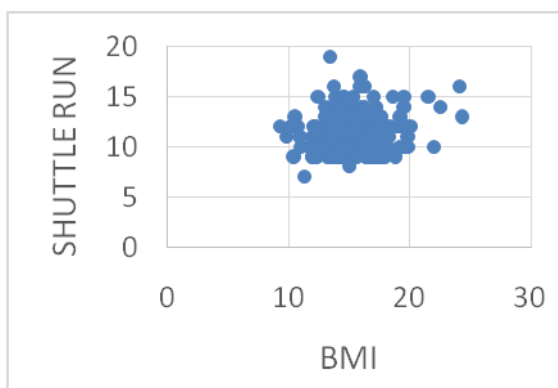
	AGE (YRS)	HEIGHT (CM)	WEIGHT (KG)	BMI (KG/M ²)	GENDER
MEAN	9.4	126.5	24.25	15.06	126 (M)
SD	0.86	5.5	4.84	2.34	109 (F)



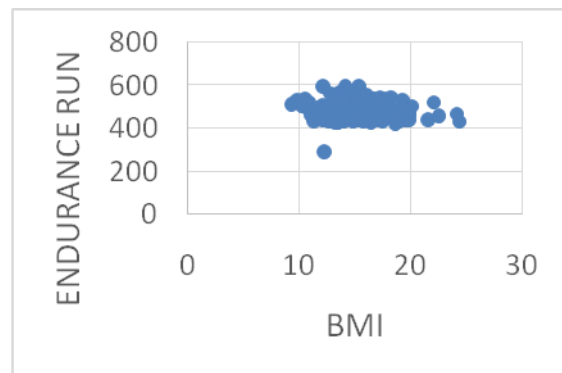
p value (0.0509)
r value (-0.12)



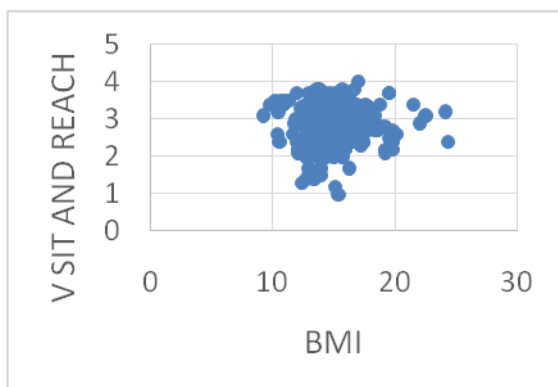
p value (0.0209)
r value (-0.15)



p value (0.2096)
r value (0.08)



p value (0.2842)
r value (-0.07)



p value (0.9710)
r value (-0.002)

DISCUSSION

As per the results very weak negative correlation was established between BMI and partial curl ups, endurance run, v sit and reach and right angle push ups. Very weak positive correlation was established between BMI and shuttle run. Positive relation was established because, along with BMI the time taken by children was also increasing but the component of speed was decreasing.

This is because of decreased levels of fitness in school going children, reasons for them being more influenced by junk food, sedentary life style and no outdoor play. There are also reported studies suggesting that many kids in India are

undernourished, which could be also because of their economic backgrounds. [2] Also attributed reasons for decreased levels of fitness among school going children were academic competitiveness which forces the child to give very little or no time for physical activity. [2] Some of the offshoots of decreased physical fitness in growing years are early onset of diabetes, hypertension, childhood asthma, etc. [3]

Lack of awareness amongst the teaching staff about physical fitness could also be one of the contributing factors. Our study which was conducted in different schools in Pune with children of varied economic backgrounds attending it, nearly had same fitness levels irrespective of their economic backgrounds (SD 2.34). Also, fitness levels were found to be nearly same in girls and boys, both the genders performed the tests equally well. It cannot be said that children were unhealthy or undernourished.

Not a single student backed out of the study, they were readily performing all the tests and nobody reported of muscle soreness post study.

It has been established that physical fitness and participation in sporting activities is crucial to child's psychological development as well as intellectual development. [3] Several positive personality traits are learned on sports field. A fit person exudes greater self-confidence, has more energy and is able to perform better under stress. Teachers and children need to be sensitized to these tenets. It is extremely important to design fitness programs for schools, tailored to age groups and baseline fitness characteristics that would ensure

minimum physical fitness levels in the schools.

CONCLUSION

The results therefore conclude that there was very weak negative correlation between BMI and partial curl ups, right angle push ups, V sit and reach and endurance run in school going children in Deccan, Pune. There was very weak positive correlation between BMI and the shuttle run test.

We conclude that basic levels of physical fitness in school going children are low.

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