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Correlation Between Physical Fitness And Academic Achievement In School Children

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ABSTRACT

Background: By using physical activity questionnaire-adolescent (PAQ-A) we can measure the physical activity level in school children and academic achievement. **Aims and objective**: to find out correlation between physical fitness and academic achievement in school children. **Methodology:** 297 subjects were taken; all subjects were allotted a questionnaire and explained how to fill it. The physical activity of subjects were found with the help of physical activity questionnaire-adolescent (PAQ-A) to find out the level of physical activity from the last 7 days includes sports or dance and other activities. **Result:** The updated data were collected for physical activity questionnaire. descriptive statistics including mean and standard deviation of age. Frequency percentage of gender and standard were analyses by pie chart**. Conclusion**: Physical fitness in children is important but they tend to lead a sedentary life due to burden of studies and excessive use of modern technology for entertainment. This study concludes that there is decrease in the physical activity and academic achievement.

INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscle that requires energy expenditure.[1] The term physical activity should not be mistaken with 'exercise' exercise is a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective.Physical activity includes exercise as well as other activities which involve bodily movement and are done as part of playing, working, active transportation, and recreational activities. Physical inactivity has been identified as the fourth leading risk factor for global mortality causing an estimated death globally .[1] physical inactivity in children is due to sedentary recreational behaviors , such as television viewing and computer use may contribute to low level of physical

activity among children.[2] Increasing physical activity is a societal, not just an individual problem. Therefore, it demands a population-based, multi-sectoral, multi-disciplinary, and culturally relevant approach regular moderate intensity physical activity – such as walking, cycling, or participating in sports activities – has significant benefits for health. The amount of energy expended by each person is a continuous variable, ranging from low to high. The total amount of caloric expenditure associated with physical activity is determined by the amount of muscle mass producing bodily movements and the intensity, duration, and frequency of muscular contractions. Using physical activity questionnaire-Adolescent (PAQ-A) measure daily activity in school student. By using this questionnaire, we can measure the Physical activity level. Physical activity recommendations for specific age groups by World Health Origination (WHO). For children and young people, physical activity includes play, games, sports, transportation, chores, recreation, physical education, or planned exercise, in the context of family, school, and community activities. The recommendations to improve cardio respiratory and muscular fitness, bone health, and cardiovascular and metabolic health biomarkers are: Children and youth aged 14-18 should accumulate at least 60 minutes of moderate - to vigorous-intensity physical activity daily. Amounts of physical activity greater than 60 minutes provide additional health benefits. Most of the daily physical activity should be aerobic. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least 3 times per week.[1] However, given a supportive environment, increasing levels of physical activity bring health benefits across age groups. World Health Organization provides recommendations for the optimal amounts of activity, but doing some physical activity is better than doing none. Inactive people should start with small amounts of physical activity and gradually increase duration, frequency and intensity over time.[1] Intensity of physical activity refers to the rate at which the activity is being performed or the magnitude of the effort required to perform an activity or exercise. It can be thought of "How hard a person works to do the activity". The intensity of physical activity varies between people. The intensity of physical activity depends on an individual's previous exercise experience and their relative level of fitness. Physical activity related neuro-physiological changes in the brain have been hypothesized to explain the positive influence of physical fitness on academic performance, such as that physical activity increases brain blood flow, improves neuro-electric functionality, and stimulates the release of brain-derived neurotrophic factor that facilitates learning and maintains cognitive functions by improving synaptic plasticity.[3] Physical activity is any body movement produced by muscle action that increases energy expenditure, whereas physical exercise refers to planned, structured, systematic and purposeful physical activity. Regular physical activity in children and adolescents promotes health and fitness compared to those who are inactive physically active youth have higher levels of cardio respiratory fitness and stronger muscles. They also typically have lower body fatness and their bones re even stronger.[4] It is important to encourage young people to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer variety.[4] A Comprehensive School Physical Activity Program (CSPAP) is a multi- component approach by which school districts and schools use all opportunities for students to be physically active, meet the nationally-recommended 60 minutes of physical activity each day, and develop the knowledge, skills, and confidence to be physically active for a lifetime. A Comprehensive School Physical Activity Program reflects strong coordination and synergy across all of the components: quality physical education as the foundation, physical activity before, during, and after school, staff involvement, and family and community engagement.[5] Physical fitness is the capacity to perform physical activity, and makes reference to a full range of physiological and psychological qualities. Cardio respiratory fitness, also called cardiovascular fitness or maximal aerobic power, is the overall capacity of the cardiovascular and respiratory systems and the ability to carry out prolonged strenuous exercise. At the beginning of exercise, the cardiovascular adaptations are very rapid: "Within a second after muscular contraction, there is a withdrawal of vagal outflow to the heart, which is followed by an increase in sympathetic stimulation of the heart. Regular exercise makes these systems more efficient by enlarging the heart muscle, enabling more blood to be pumped with each stroke, and increasing the number of small arteries in trained skeletal muscles, which supply

more blood to working muscles. Children with higher physical activity levels have also higher fitness levels.[6] A recent review has shown in children a positive relationship between levels of physical-activity and academic performance and executive function. Research usin objective measures of physical activity/fitness and academic achievement has indicated a positive relationship between these variables.[7,8] Cardio-respiratory fitness, also called cardiovascular fitness or maximal aerobic power, is the overall capacity of the cardiovascular and respiratory systems and the ability to carry out prolonged strenuous exercise. Elevated levels of physical activity and fitness might also be related to better academic performance in children. Speed is the ability to move the body (or some parts of the body) as fast as possible. Agility is the ability to move quickly and change direction while maintaining control and balance. Consequently, agility is a combination of speed, balance, power and coordination. Academic achievement was estimated from the final grades of the participants the previous year (2009/2010, third and fourth grades). We averaged the marks obtained in Mathematics, Language and Literature, Natural, Social and Cultural Sciences, and English. Researchers have explored the impact of gender when documenting the association between physical activity/fitness and academic achievement in children. Whereas some research indicates the relationship is stronger for girls, results from other studies have reported no significant differences between boys and girls.[3,6,8,9,10] Interestingly, no study has demonstrated the relationship between physical fitness and academic achievement to be stronger for boys. Additionally, the relationship between physical activity or physical fitness and the different components of academic achievement has been studied. Some authors indicate that physical activity and physical fitness are significantly correlated with mathematical performance but not with other subjects[10], whereas most articles note that physical activity and physical fitness are also correlated with performance in other subjects, such as language ability or social sciences; nevertheless, math or numeracy scores seem to exhibit the highest correlation with physical activity [11,12,13].Most studies examining the relationship among physical activity, physical fitness and academic achievement exhibit a cross-sectional design, and in some cases, promotional campaigns have been performed.

Materials and Methodology: Research Population: School Students. Source Of Data: Shree Shantaram Bhat English Medium School, Mota. Shree Sharaswati Shishu Mandir, Bardoli.

Study Design: This is a Cross-sectional study to find out the co-relation between physical fitness and academic achievement in school children. Sample Size: A total of 297 subject to were found to be falling in the category of were included in the present study for analysis. Sampling Method: Random Sampling. **Material Used: Pen**, Paper The consent form, Physical Activity Questionnaire-Adolescent (PAQ-A) **Inclusion Criteria**: Age: 14 to 18 year. Gender: Boys and Girls. **Exclusion Criteria**: Student's with behavioral issues. Participants who are not willing to participate in the study.

Procedure: The present study titling "correlation between physical fitness and academic achievement" was initiated after the clearance obtained from the institutional committee of ethics of the Shrimad Rajchandra College of Physiotherapy . A total 100 subject Students who willing to participant in the study, was be included using convenient sampling and who was not willing to participant was be excluded. A detail explanation regarding the complete procedure was done for each subject and as formality towards their willingness to be a part of this study. They were asked to sign written consent. The purpose of the study was be explained in detail and written informed consent was be obtained from all the students. After taking written consent, all students was be asked to rest on chair and remain comfortable and relaxed. After getting all the information and giving proper positions as mentioned below the clinical test like Physical activity questionnaire-Adolescent (PAQ-A).The data was be collected by making personal visit of Shree Shantaram Bhutt English Medium School Mota, Bardoli. The Physical Activity Questionnaire- Adolescent (PAQ-A) to measure the physical activity level in school children. Instruction about the statements of the questionnaire was be given to the students and was be encouraged to ask any question regarding the unclearness of the question of the questionnaire. Academic achievement was estimated from the final grades of the participants the previous year. We averaged the marks obtained in Mathematics, Language and

Literature, Natural, Social and Cultural Sciences, and English.

Statistical Analysis: After collecting data, analysis was done to derive conclusion regarding the Co- relation between Physical Fitness and Academic Achievement in School Children. Subject was analyzed after basis of Physical Activity Questionnaire and academic grade. Thereafter, the subjects are PAQ-A value was compared with the academic grade. Spearman used to find out The Co-relation between Physical Fitness and Academic Achievement in School Children.

Table: 1 Demographic statistics of students (n=297)

AGE	Mean ±SD
	16±1.18

Above Table shows descriptive statistics of age for all the students.

The mean age of subjects is 16.06year and (S.D=1.188)

Minimum age is 14 years and Maximum age is 18 years

Chart: - 1Shows Percentage of gender distribution among the student.

In above pie chart there were 60% of male and a 40% of female of all students.

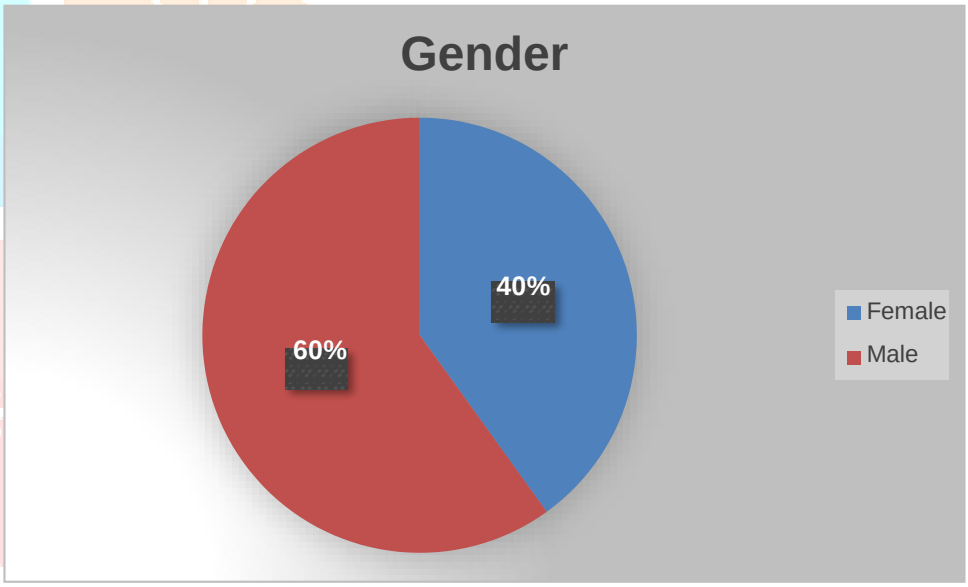
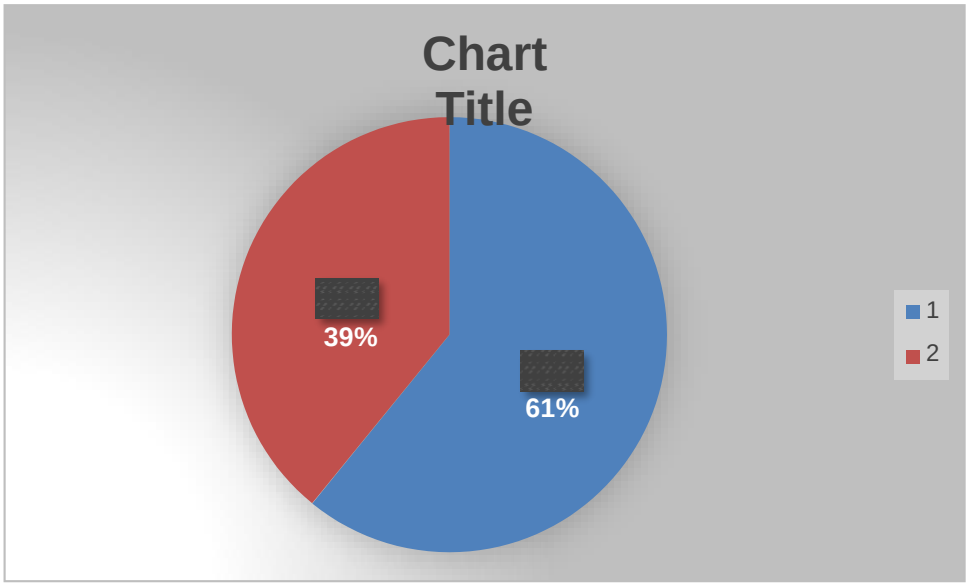


Chart:-2Shows the Standard Distribution Of Among Student.



In above pie chart there were 61% of 10 standard and 39% of 12 standard.

Result: To find out co-relation between physical fitness and academic achievement in school children were analyzed by calculating the Spearman. The update data were collected for physical activity questionnaire. Descriptive statistics including mean and standard deviation of age. Frequency percentage of gender and standard were analyzed by pie chart. The co-relation between physical fitness and academic achievement by using spearman co-efficient. The obtain result were considered significant if value p <0.005.

Discussion:-The cross sectional study aim to find out the correlation between physical fitness and academic achievement in school children in age group 14 to 18 year. For this study total number of 297 students with age mean and standard deviation 16.13 ±1.188. Frequency percentage analyzed by pie chart the gender 60% of female and 40% of male. A data were normality distribution on spearman correlate for used. And the correlation between physical activity questionnaire (PAQ-A) were analyzed by using spearman coefficient. The co-relation between physical fitness and academic achievement in school children are not significant. Physical activity provides fundamental health benefits for children and youth Appropriate levels of physical activity contribute to the development of healthy musculoskeletal tissues (i.e. bones, muscles and joints)healthy cardiovascular system (i.e. heart and lungs), neuromuscular awareness (i.e. coordination and movement control) and it also facilitates maintenance of a healthy body weight. Although there were some variations in correlations for boys and girls, and at different ages, the variations were less impressive than the similarity of finding across age and gender groups. The main contribution of this study is the analysis of the interactions among physical activity, physical fitness and academic performance, which allows a non- lineal visual interpretation of this relationship as well as the changes of profiles experienced by the participants during the time elapsed in the secondary school. These results are partly in accordance with other cross-sectional studies. Some studies indicate that the increase in physical activity and the improvement of physical fitness is positively associated with mental health components, self- esteem, emotional wellbeing and self- concept. Physical activity and higher physical fitness may improve students' attention and behavior in the classroom. Although it is still difficult to draw definitive conclusions regarding the relationship between physical activity and academic achievement, the overall findings show a positive relationship; as physical activity (including fitness, sports participation, and physical education) increases, cognitive function and academic achievement generally improve. The physical activity questionnaire for adolescents is a nine item, seven day self- report recall questionnaire designed and extensively used for surveillance and monitoring. The physical activity questionnaire (PAQ –A) is self - administered. It was developed to assess general levels of physical activity for high schools students in grades 9 to 12 and approximately 14 to 19 years of age. Motivated students may strive for achievement in both academic subjects

and physical fitness; students' physical fitness is associated with better health, which may contribute positively to academic achievement; physical activity and higher physical fitness may improve students' attention and behavior in the classroom; and physical activity may improve mental health and self-esteem. The strong co-relation might be limited. The present study based on Torrijos-nino-fitness-obesity-achievement –JP-in press - 2014 et al to find out the co-relation between physical fitness and academic achievement in school children. The result provided to be highly significant. The discrepancy of the result of this study might occurred due to small age group had been selected and only 10^{th} and 12^{th} standards were included.

Limitation: The main limitation of this study is its cross sectional design which does not allow any inference of temporality or a possible causal relationship between fitness and academic performance. However, this study's sample was representative of the state population of schoolchildren with regard to age range, gender, school-level distribution, and economic status, which supports its generalizability to the state level. There are design issues that should be taken into account when interpreting the results of this study. It cannot be concluded from these data that higher levels of physical fitness caused an increase or improvement in academic achievement or vice versa.

Conclusion: Physical fitness in children is important but they tend to lead a sedentary life due to burden of studies and excessive use modern technology for entertainment. This study concludes that there is decrease in the physical activity and academic achievement.

Ethical clearance: Ethical approval was obtained from the Shrimad Raj Chandra College of Physiotherapy.

Source of funding-self

Conflict of interest: Nil

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