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RELATIONSHIP BETWEEN THE HEALTH-RELATED FITNESS COMPONENTS AND PERFORMANCE IN THE CORE SUBJECTS OF HIGH SCHOOL STUDENTS(MATH, SCIENCE, AND ENGLISH)

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The Relationship of Health-Related Fitness Components to the Core Subjects of the Students (Math, Science, and English)

Abstract

The purpose of this study was to determine the relationship of the level of health-related fitness components to the grades of core subjects of the students. The increase in emphasis on academic outcomes has reduced the amount of time in Physical Education class (Lorenz, et. al. 2017). This led the researchers to this study to see if there is a significant relationship between the level of health related components of fitness to the grades of core subject grades of the students. The purpose of this research was to study and evaluate the relationship between the level of Health-related fitness components to the core subjects of the students which are Math, Science, and English. There are 40 high school students involved in this study (N=40, 25 male and 15 female) and each of the students undergone in fitness testing on the first week of their class in P.E, (1 Kilometer run for cardiovascular endurance, BMI for Body composition, Sit and reach for Flexibility, Partial curl ups for Muscular strength, and push-up for Muscular endurance). Out of forty students the mean grade for Math is 88.03 ± 2.3 , 89.78 ± 2.25 for Science, and 87.45 ± 1.37 for English. Pearson's Correlation Coefficient was used to test the relationship between the Health-related components and the grades of the students in Core subjects (Math, Science, and English). Result: there is low relationship between Health-related fitness level of the students to their grades in Math, Science, and English.

Keywords: *Health-related fitness, Core subjects*

I. INTRODUCTION

Academic outcomes have reduced the amount of time spent in physical education and other school activity opportunities in many schools. However, physical fitness is positive predictor of academic performance on standardized tests, and students who perform better in fitness measures may earn higher grades. The purpose of this study is to evaluate the relationship of Health-related fitness components to the core subjects of the students (Math, English and Science).

Having a health enhancing level of aerobic fitness was a positive influence for academic achievement regardless of gender or race (Hobbs, 2014). School districts need to allocate sufficient funds, resources, personnel, and facilities in order to provide students with quality education at all grade levels. Over the past 50 years research has typically demonstrated either no, or weak relationship between academic performance and physical performance. Nevertheless, the fact that any positive relationship has been found lead to the “healthy children learn better” concept currently being promoted in schools, and used as rationale to justify physical education programs (Martin, 2007). Accordingly, physical education programs should not be advocated as a means to promote academic achievement in students.

It has been suggested that the benefits gained from, or performance in, physical education are related to academic achievement (Almond & McGeorge, 1998; Black, 1995). Some have advocated that not necessarily physical education, but physical activity and fitness are related to cognitive performance and achievement (Dustman, Emmerson, & Shearer, 1994; Etnier et al., 1997). Thus the concept that “healthy children learn better” is being promoted in schools and elsewhere (Symons, Cinelli, James, & Groff, 1997).

An examination of 7,961 youngsters from 7 to 15 years of age in Australia was conducted by Dwyer, Sallis, Blizzard, Lazarus and Dean (2001). School ratings ability was compared with performance on variety of fitness measures including sit-ups, push-ups, and a 1.6 kilometer run. Across the age groups, there were significant, but weak, correlations (ranging from .1 to .27) between fitness (cardiorespiratory endurance, muscular force and power) and academic performance (Martin, 2007).

In summary, research examining the relationship between academic achievement and physical fitness has produced mixed results. As evidence by history of investigations, importance of understanding the relationship between physical fitness and academic performance in children and youth is relevant and increased by recent evidence form studies conducted on animals and elderly humans that increased physical activity results in improved cognitive function (Colcombe et al., 2004; McAuley, Kramer, & Colcombe 2004; Rhodes et al., 2003).

While some may argue about the validity of physical fitness assessments, their use is common practice in physical education, and measures of fitness are often required in state and local curricula. For those in the profession of health promotion and physical education, causation would be a beneficial result and would no doubt enhance the argument for “healthy children learn better”.

The purpose of this study is to test the relationship between health-related fitness and the core subjects (Math, Science, and English) of the students and may urge students to participate in physical activities and give importance to fitness testing as school-based program.

2. MATERIALS AND METHODS

2.1 Subjects and Sampling

Forty (40) students have been selected to participate in this study 15 of those are female and 25 are male students and they were selected via convenience sampling. Out of forty students the mean grade for Math is 88.03 ± 2.3 , 89.78 ± 2.25 for Science, and 87.45 ± 1.37 for English.

The inclusion criteria are as follows: the participants must be attending school, must have undergone fitness testing and has recorded the results of the tests.

2.2 Instruments

Fitness testing activities is the instrument used to get their level in health-related components of fitness, Body composition which is their BMI (Body mass index), Cardiovascular endurance (1 kilometer run), Flexibility (Sit and reach) m, Muscular strength (partial curl-ups), Muscular endurance (push-ups). All of these were performed during their class in P.E and was supervised by the instructors. For their grades, school cards or report cards from their schools are used, computed the average of the grades from first grading to forth grading period.

2.3 Procedure

Letter were sent to a participating school indicating (1) we will be conducting a survey I their school, and (2) we will be using their selected students' grades record in in three subjects (Math, Science, and English) only. After the approval of the letter, we gather all the data needed for this study.

Students conducted health related fitness tests only which includes cardiovascular endurance, body composition, muscular strength, muscular endurance, and flexibility. All data have been recorded including the grades of the students.

On the first day we students were asked to measure their height and weight for their Body mass index, next is Sit and reach for flexibility, Push-ups, and lastly partial curl-ups. On the next day 1 kilometer run were performed by the students for cardiovascular endurance and on the same day we gather the grades with computed average from first to forth grading period from their adviser.

Table 1. Correlation table of core subjects and health-related fitness components (Male)

	Cardio	Boy Comp	Flexibility	M Strength	M. End.
Math	0.19	-0.06	-0.27	0.01	0.06
Science	-0.21	0.12	-0.08	-0.15	-0.05
English	-0.14	-0.14	0.06	-0.31	-0.21

Table 2. Correlation table of core subjects and health-related fitness components (female)

	Cardio	Boy Comp	Flexibility	M Strength	M. End.
Math	0.16	-0.07	0.09	0.23	0.44
Science	-0.18	0.23	0.01	-0.10	-0.18
English	-0.25	-0.31	-0.46	0.35	-0.08

2.4 Statistical Analysis

Descriptive statistics using excel were used for the demographic profile information of the participants. Out of forty students 15 or 37.5% are female and 25 or 62.5 are male. Pearson's r correlation coefficient were used to test the relationship between Health-related fitness and core subjects of the students.

3. RESULTS

Test of relationship between Core subjects and Health-related fitness

There is a very low to low relationship between the core subjects and health-related fitness of the male students while very low to moderate relationship was seen between core subjects and health-related fitness of female. A moderate relationship was seen between English and Flexibility (0.46) female students and moderate relationship (0.44) between Math and muscular endurance.

4. DISCUSSION

Increased emphasis on academic outcomes has reduced the amount of time spent in physical education and other school physical activity opportunities in many schools (K. Lorenz et. Al, 2017) giving importance on the academic side of the curriculum and compromising physical activities. In Dr. Hideaki Soya from University of Tsukuba in Japan showed that there is direct relationship between brain activity, brain function and physical fitness in a group of older Japanese men. They found out that the fitter men performed better mentally than the less fit men, by using parts of their brains in the same way as in their youth (University of Tsukuba. (2015, October 23).

Active body, active mind: The secret to a younger brain may lie in exercising your body). Having a health enhancing **level** of aerobic **fitness** was a positive influence for academic achievement regardless of gender or race (M. Hobbs, 2014) this does incorporate the saying “a sound body is a sound mind and Quality **school** physical education programs have many positive effects, including motor skill and physical **fitness** development of students (National Association for Sport and Physical Education, 2002). Rationalizing **school** physical education as a means to also improve academic achievement of students, however, does not appear to be justified (Martin, Lea Ann Tyson, Chalmers, Gordon R., Physical Educator, Early Winter2007, Vol. 64, Issue 4).

Schools physical education programs are often marginalized or the target of budget cuts because of their lack of inclusion (L. Tyson et. Al, 2007) meaning that most of the schools focus on the academic and less on the physical activities including P.E classes. On this study there is a low to moderate relationship between the health-related fitness and core subject grades (Math,

Science, English) of the students, thus we propose for further and deeper studies for this research and suggesting that academic and physical education classes must be equal in time allotment.

The sample size might affect the result of this study since we only gather forty respondents a bigger chance of relation might be seen if the sample size was high enough. Another research can be conducted with a higher number of respondents can be done to test the relationship of the two variables.

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