

Differences of Gender and Race on the Level of Physical Fitness of Students at Two Midwestern Middle Schools in United States

從性別和種族角度評價美國中西部地區兩校中學生體質狀況

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Abstract

This quantitative study measured physical strength and endurance fitness scores of 132 students at two Midwestern middle schools who participated in daily and non-daily physical education classes. A comparison for gender and race was made for the two schools during the 2005/06 school year. Data was gathered using the Fitnessgram, a tool that evaluates fitness performance using criterion-referenced standards. Results indicated that students at the daily physical education on an average scored higher ($m = 24.5$) on push-ups than students at the non-daily school ($m = 11.9$). However, the non-daily PE students scored higher on sit-ups ($m = 48.2$) than the daily PE students ($m = 36.8$). It was concluded that although the state of Iowa does not mandate physical education in elementary, middle, and high school, it was essential that school children have daily physical education to ensure good health and promotion of high academic performance.

Key Words: Fitness, Gender, Physical Education, Race, Muscular Strength and Endurance



摘要

本文通過對美國中西部地區一所有每天體育課學校和一所沒有每天體育課學校的132名中學生進行了身體力量和耐力水準的定量測試。所得資料依照Fitness-Gram標準，從性別和種族層面分析，比較和評價了2005-2006年兩校中學生的體質狀況。研究發現，開設每天體育課學校的學生俯臥撐的平均分 ($m=24.5$) 高於沒有開設每天體育課學校的學生平均分 ($m=11.9$)；而沒有開設每天體育課學校的學生仰臥起坐的平均分($m=48.2$)高於開設每天體育課學校的學生平均分 ($m=36.8$)。儘管愛荷華州並未對本州小學、中學和高中體育課設置統一的標準，但值得注意的是學生堅持每天上體育課不僅有益身體健康也有利於學習成績的提高。

關鍵詞：體適能、性別、體育、種族、肌力與肌耐力

Introduction

Physical activity can be viewed as any form of exercise or movement. It may include planned activity such as walking, running, basketball, or other sports (Obesity, Physical Activity, and Weight Control Glossary, 2007). Despite the proven benefits of physical activity and fitness, more than a third of young people in grades 6-12 in the U.S. do not regularly engage in vigorous-

intensity physical activity (Troost et al., 2002). As a result, childhood obesity rates and illnesses related to being inactive and overweight have elevated among “preschool aged children as well as older children and adolescents” (Pate et al., 2004; Williams et al., 2002) suggests that counteracting, addressing, and tracking this alarming trend among American children through incorporating and increasing children’s level of physical activity as opposed to sedentary activities, will contribute to increased

self esteem, life-long health habits, and additional health benefits such as flexibility, muscle strength, and cardiovascular fitness.

Sedentary lifestyles such as playing video or computer games and watching movies or television, as well as physical inactivity of adolescents in the U.S. are widely reported. In 2007 the Center for Disease Control (CDC) reported daily participation by students in school physical education classes dropped from 42% in 1991 to 33% in 2005 (CDC, 2007). The National Association for Sports and Physical Education (NASPE, 2006) revealed in its "Shape of the Nation" report that more than a third of young people in middle and high schools do not regularly engage in vigorous physical activities. Those that engage in physical activity get insufficient amounts of moderate to vigorous physical activity. The report further indicates participation in physical activity declined as students got older (Shape of the Nation, 2006). The report reveals as the students transitioned from middle school to high school, their enrollment in physical education declined dramatically. For instance, in 2003 the enrollment in physical education for 8th graders was 56%; 9th grade, 71% ; 10th graders, 61%; 11th graders, 46% ; and 12th graders was only 40% (Shape of the Nation, 2006).

Hausenblas et al. (2002), share similar observation that on the "Shape of the Nation" report that time of physical activity decline occurs during the transition from middle level school to high school. According to Sallis et al. (2003) the "steepest decline in physical activity happens between 13 and 18 years of age" (p. 437). Therefore, it is essential to examine the fitness performance levels of middle-level school students.

One way to encourage regular physical activity among adolescents is through developing a curriculum that emphasizes the provision of physical education in middle schools. Townsend (2006), states that physical education represents an area of the middle school curriculum that has the potential to positively impact adolescents. There are many benefits for physical education including impact on adolescents' knowledge development, attitudes and beliefs, as well as their behaviors (Townsend, 2006). In addition, physical education helps students develop fitness levels, motor skills, and personal and social skills necessary for obtaining the ultimate goal of a lifetime and prosperous health. Townsend (2006) further argues that these benefits may endure across the lifespan. Boyles-

Holmes (2007) suggests that all children, from pre-kindergarten through grade 12, should participate in quality physical education classes every school day. According to Boyles-Holmes (2007), a quality physical education program should include curriculum aligned instruction and assessment and an opportunity for all to learn.

Despite the many benefits of physical education in middle schools, some states in the U.S. have not seriously mandated the middle school curriculum to incorporate physical education as a comprehensive approach to enhancing healthy lifestyles and academic integrity for middle school adolescents. Twenty years ago the U.S. Congress passed the "House Concurrent Resolution 97". This resolution encouraged states and local governments and local education agencies to provide high-quality daily physical education programs for all children in kindergarten through grade 12. In the year 2000 "Goal 2000" was enacted, calling for inclusion of physical education as an integral component of all school programs. In 2002 the Surgeon General called for action to be taken to prevent and decrease overweight and obesity by putting forth quality daily K-12 physical education for all children. With all these attempts by the government and some distinguished officials to help K-12 children pursue quality lifestyles, and the need for school curriculums that put physical education at the frontline of school curriculums, inadequate progress has been made (Shape of the Nation, 2006). Not all US states mandate middle schools to incorporate physical education into their curriculums.

Iowa is one of the US states that has not made adequate progress in ensuring that physical education is an integral component in middle school education programs. In Iowa, there is no state mandate for physical education in elementary school, middle school, and senior high school. The state mandates that physical education be taught in grades 9 to 11; however, it does not require students to participate in physical education during school time. In addition, Iowa does not require students be assessed in physical education (Shape of the Nation, 2006). The void in Iowa law in regards to physical education allows individual school districts the option to incorporate physical education in their school curriculums. Without doubt, this lack of physical education mandates for schools puts at risk the physical, social, and emotional health and well-being of school children.

The purpose of this study was to measure the physical strength and endurance (push-up and curl-up) of students at two middle schools that participated in daily and non daily physical education classes during the 2005 – 2006 school year. Both schools are located in a midwestern state. The total enrollment for 6th grade students at the daily physical education school was 229, and the average class size was 22.6. The total enrollment for 7th grade students at the daily physical education school was 245, and the average class size was 23.1. The total enrollment for 6th grade students at the non-daily physical education school was 213, and the average class size was 24.2. The total enrollment for 7th grade students at the non-daily physical education school was 229, and the average class size was 26.1.

This study began with three hypotheses: (1) there no significant statistical difference in physical strength and endurance between the pre and post-test scores among the daily physical education students; (2) there is no significant difference for fitness scores of daily and non-daily physical education students, and (3) there is no gender difference for fitness scores of daily and non-daily physical education students.

A number of studies have been conducted to determine physical activity levels between gender and ethnicity at the national level. The majority of these studies report significant gender and race differences in physical activity levels. Beighle et al. (2006) conducted a study among 270 third, fourth and fifth grade students in a suburban elementary school in the southwestern United States to determine physical activity levels during recess and outside school. The walk4life pedometers were used and readings were taken before and after recess time. A factorial analysis was performed for gender and grade levels and no interaction between gender and grade levels were found. However, a significant main effect for gender indicated that males were more active during recess time. In order to determine adolescent physical activity and inactivity patterns, Gordon-Larsen et al. (2000) tested gender and ethnicity variables. The researchers found that physical activity was mainly associated with environmental factors, such as school and community sports, home access to fitness equipment, outdoor play spaces, and exercise opportunities. An environment that promotes excessive food intake and discourages physical activities, on the other hand, was mainly associated with socio-demographic factors such as education, family income, and the influence of ethnicity on activity.

Methods

Participants

Participants were middle school students (Grades 6 and 7) from daily and non-daily physical education classes. There was a total of forty-three 6th grade and twenty-nine 7th grade daily physical education students in this study. There were a total of twenty-two 6th grade and thirty-six 7th grade non-daily physical education students in the study. The majority race participants from the daily physical education school were 58% white and 77% white at the non-daily physical education school.

Instrument

The Fitnessgram Standards for Healthy Fitness Zone was used in evaluating the fitness level of students in grades 6th and 7th. According to Grissom (2005), Fitnessgram uses standards established by the Cooper Institute for Aerobic Research to evaluate performance. Performance is classified as: (1) in the healthy fitness zone (HFZ) which means students met the first target or (2) needs improvement which means students failed to meet the target. The targets are based on the age and gender of participants. The HFZ scores for the curl-up test range from 12 to 35 for females and 12 to 47 for males. The HFZ scores for the push-up test range from 7 to 15 for females and 7 to 35 for males. The instrument has been used extensively by various researchers to measure student fitness level, and therefore deemed to be reliable. According to Safrit & Wood (1987), the instrument has a reliability of $r = .62$ for male age eleven curl-up test, $r = .83$ age twelve, $r = .79$ age thirteen, and age $r = .86$ for age fourteen. Curl-up test for females age eleven has a reliability of $r = .64$, $r = .85$ age twelve, $r = .89$ age thirteen, and $r = .81$ for age fourteen. The reliability of push-up scores was $r = .75$. In this study, data using Fitnessgram was collected in accordance to the district policy of physical education standards. All physical education teachers were required to collect and report data of student performance.

Testing Procedures

Fitness tests were given at the end of a two week unit of fitness at the daily physical education middle school, during the month of November 2005 (pre-test) and March 2006 (post-test). Fitness activities included circuit training with upper body exercise equipment (lat pull, bench press, chest press) and cardiovascular fitness

(jogging). Each student was to select a partner and while one student ran a lap the partner was using exercise equipment. The student jogging would return to the weight room and begin using the exercise equipment, while the partner ran one lap. Students would return from lap and rotate to the next exercise equipment, while the partner ran one lap. Circuit training would continue for 30 minutes. The fitness test was given at the non-daily Physical Education middle school at the end of a fitness unit during of the month of March 2006.

Each student stated his/her name and age before performing the push-up and curl-up tests. Students were assigned in pairs of two; one student performed the fitness skill test and the other counted the number of repetitions. A whistle was used to start the test. The students performed skills for one minute. A whistle was used to stop the test and the student-counter of repetitions reported the score to the physical education teacher who recorded the scores. Students then switched roles and the performer of skills became the counter of repetitions and the counter of repetitions was the performer of fitness skill test. The scores at the daily physical education school were recorded on a fitness score sheet and manually analyzed with Fitnessgram standards. The scores at the non-daily physical education school were recorded on a fitness score sheet and imputed in the Fitnessgram Version 6.0 software.

Data Analysis

Data for this study was analyzed using the Statistical Package for the Social Sciences (SPSS)-PC, version 13. Two statistical tests were performed: descriptive statistics and Bivariate statistics, the t-test. The descriptive statistics were utilized in order to determine the sample characteristics of two middle schools. In this test, frequencies and percentages of participants' physical fitness

levels as recorded by the test examiner were calculated for each test item. Frequencies and percentages were also used to determine number and percentage of participants in regards to gender, grade level, age, and class size. Bivariate statistics included the independent samples t-test, and paired samples t-test. The independent samples t-test was used to test for difference between the means of two independent groups; i.e. the means of continuous variables. In this study the independent samples t-test was utilized to compare the difference of mean scores for male and female students' physical fitness levels, as well as, comparing performance levels of the two middle schools. The paired samples t-test was used to calculate and compare the mean scores of the pre- and post-test scores for the daily physical education students.

Results

One hundred–eleven students from grades six, seven and eight were tested for physical fitness at the daily physical education school. Their percentages according to the grade levels was: grades sixth (38.7%), seventh (27%), and eighth (34.2%). Among the 111 students who were tested for pre- and post- physical fitness, the majority were female (58.6%) and 57.7% white students. The participants' ranged from ages 11 to 14 years old with majority being age 12 and 13 years old. During the pre-test period, a majority (91.4%) of students from all three grade levels were able to perform at least 10 to 40 push-ups. Sixty-nine percent of students were capable of performing 21 to 50 curl-ups during their pre-test phase.

The post-test results indicated 66.6% of students from all three participating grade levels performed 10 to 30 push-ups. The post-test results for curl-ups indicated 91.8% of students were capable of performing 21 to 60 curl-ups.

Table 1. Demographic Information.

		Non-daily P.E		Daily P. E.	
		N	%	N	%
Gender	Male	29	49.2	46	41.4
	Female	30	50.8	65	58.6
Age	Eleven years	11	18.6	25	22.5
	Twelve years	21	35.6	33	29.7
	Thirteen years	25	42.4	43	38.7
	Fourteen years	2	3.4	10	9.0
Grade	Sixth grade	22	37.3	43	38.7
	Seventh grade	37	62.7	30	27.0
	Eighth grade	*	*	38	34.2

(*) not assessed

There were 59 students from non-daily physical education middle school that participated in the physical fitness test. Half of the students that participated were female from grades sixth and seventh only. On an average, male students performed higher on push-up than

female students. Male students scored an average of 14.3 push-ups while females scored 10 push-ups. However, female students outperformed male students during curl-up fitness test: female scored an average of 50 curl-ups while male scored an average of 46 curl-ups.

Table 2. Measure of Central Tendency (Mean Scores) Daily and Non-daily Physical Education Middle School.

	Non-Daily P.E. (N=59)		Daily P.E. (N=111)			
	Push-ups	Curl-ups	Push-ups		Curl-ups	
			Pre	Post-test	Pre	Post-test
Male	14.28	46.14	29.69	29.80	45.00	45.40
Female	9.60	50.31	18.37	18.12	34.67	34.67

For the daily physical middle school, male student's score higher than their female counterparts during both pre- and post-test periods for both push-ups and curl-

ups fitness tests. There was no improvement of test score from pre- to post-test.

Table 3. Paired- Samples t-test Daily Physical Education Middle School: Pre & Post- test Scores.

Test	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Push-ups	22.6	11.289	89	-.563	.58
	23.3	13.633			
Curl-ups	38.9	12.186	97	-.347	.73
	39.3	12.364			
Pull-ups	5.3	4.817	47	.997	.324
	4.9	4.635			

A two- tailed paired-samples t-test was performed to compare the pre-test mean scores of push-ups and curl-ups to the mean scores of post-test push-ups and curl-ups for students in the daily physical education Middle School. The results indicated the pre-test push-up mean score was 22.59 (sd = 11.289) and the mean score for the push-up post-test was 23.28 (sd = 13.633). No significant

difference between the pre-test and post-test push-up mean scores was found (t (89) = -.563, p > .05). The pre-test mean score for curl-ups was 38.91 (sd = 12.186) and the post-test mean score was 39.27 (sd = 12.364). No significant difference between the pre- and post-test curl-ups scores was found (t (97) = -.347, p > .05).

Table 4. Independent Samples t-test Comparing Mean Scores for Non-daily and Daily Physical Education Middle School.

Test	School	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Push-Ups	Non-daily	11.90	6.850	-7.823	126	.001**
	Daily	24.52	10.650			
Curl-Ups	Non-daily	48.22	22.537	3.658	131	.001**
	Daily	36.84	13.022			

Note: **Significant at P< .05, unless otherwise stated.

An independent-samples t-test comparing the mean scores for daily and non-daily physical education middle school students. Results of the push-up test indicated a significant difference between the means of the two schools ($t(126) = -7.823, p < .05$). The push-up mean score for the daily physical education Middle School was significantly higher ($m = 24.52, sd = 10.65$) than the mean score for the non-daily physical education school ($m = 11.90, sd = 6.85$). A t-test of independent samples was also computed comparing curl-up mean scores for daily

and non-daily physical education Middle School students. A statistical significant difference between the mean scores of the two schools was found ($t(131) = 3.658, p < .05$). The push-up mean score for the non-daily physical education school was higher ($m = 48, sd = 22.537$) than the push-up mean score for the daily physical education Middle School ($m = 36.84, sd = 13.022$).

Only grade six and seven physical fitness scores were used in comparing the daily and non-daily physical education schools. The non-daily physical education school produced test scores for grades six and seven only.

Table 5. Independent Samples t-test Comparing Mean Scores for Non-daily and Daily Physical Education Middle School.

Test	School	M	SD	t	df	p
Push-Ups	Non-daily	11.90	6.850	-7.464	121	.001**
	Daily	26.97	14.04			
Curl-Ups	Non-daily	48.22	22.54	2.447	125	.016**
	Daily	40.59	11.73			

Note: ** Significant at $P < .05$, unless otherwise stated.

A comparison using and independent samples t-test was performed for non-daily and daily physical education Middle School. Results indicated a significant difference between the two schools. Overall, the daily physical

education students performed higher on push-ups ($t(121) = -7.464, p < .05$) but less on curl-ups ($t(125) = 2.447, p < .05$) compared to the non-daily physical education students (see table 5).

Table 6. Independent Samples t-test Comparing Mean Scores for Male and Female Non-Daily and Daily Physical Education Middle School.

Test	School	Gender	M	SD	t	df	p
Push-Ups	Non-daily/	Male	23.67	14.605	3.281	121	.001**
	Daily	Female	16.00	11.162			
Curl-Ups	Non-Daily/	Male	46.14	16.878	1.297	125	.197
	Daily	Female	42.05	18.664			

Note: **Significant at $P < .05$, unless otherwise noted.

Male students from the non-daily physical education school were compared with female students from the daily physical education school using an independent-samples t-test. A significant difference was found for push-ups. Male

students from the non-daily physical education school scored higher than female students ($t(121) = 3.281, p < .05$). There was no statistical difference with regard to curl-ups (see table 6).

Table 7. Independent Samples t-test Comparing Mean Scores for Gender between Non-Daily and Daily Physical Education School.

Test	School	Gender	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>																																
Push-Ups	Daily	Male	32.45	14.433	6.132	58	.001**																																
	Non-daily	Male	14.28	7.035				Curl-Ups	Daily	Male	46.15	11.090	.002	61	.998	Non-daily	Male	46.14	22.042	Push-Ups	Daily	Female	21.82	11.679	5.158	61	.001**	Non-daily	Female	9.60	5.911	Curl-Ups	Daily	Female	35.20	11.090	-3.500	62	.001**
Curl-Ups	Daily	Male	46.15	11.090	.002	61	.998																																
	Non-daily	Male	46.14	22.042				Push-Ups	Daily	Female	21.82	11.679	5.158	61	.001**	Non-daily	Female	9.60	5.911	Curl-Ups	Daily	Female	35.20	11.090	-3.500	62	.001**	Non-daily	Female	50.31	22.042								
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	Non-daily	Female	9.60	5.911				Curl-Ups	Daily	Female	35.20	11.090	-3.500	62	.001**	Non-daily	Female	50.31	22.042																				
Curl-Ups	Daily	Female	35.20	11.090	-3.500	62	.001**																																
	Non-daily	Female	50.31	22.042																																			

An independent-samples t-test was performed to compare the mean scores for male students from the daily and non-daily physical education schools for push-ups and curl-ups. A significant difference was observed indicating male students at the daily physical education school performed higher for push-ups than male students at the non-daily physical education school ($t(58) = 6.132, p < .05$). No statistical difference was found for curl-ups.

When female students from the daily physical education school were compared with their colleagues at the non-daily physical education school, those at the daily physical education school outperformed those at the non-daily physical education school for push-ups ($t(61) = 5.158, p < .05$). However, when compared for curl-ups, female students at the non-daily physical education school scored higher than those at the daily physical education school ($t(62) = -3.50, p < .05$ (see table 7).

Table 8. Independent Samples t-test Comparing Mean Scores for Males and Females within School.

Test	School	Gender	M	SD	t	df	p
Push-Ups	Non-daily	Male	14.28	7.035	2.768	57	.008**
		Female	9.60	5.911			
Curl-Ups	Non-daily	Male	46.14	22.042	-.702	56	.486
		Female	50.31	23.218			
Push-Ups	Daily	Male	32.45	14.433	3.249	62	.002**
		Female	21.82	11.679			
Curl-Ups	Daily	Male	46.15	11.090	4.359	67	.001**
		Female	35.20	9.746			

Note: ** Significant at $p < .05$, unless otherwise stated.

Male and female student scores at the daily and non-daily physical education schools were compared within each school to determine if their physical fitness levels differed significantly. An independent samples t-test was calculated to determine the significant level. Results indicated that male students at the non-daily physical education school outperformed female students on the push-ups test ($t(57) = 2.768, p < .05$), but a comparison for curl-ups indicated no significant difference between male and female students. Male students at the daily physical education school outperformed female students in both tests (push-ups male, $m = 32.5$; female $m = 21.8$ & curl-ups males, $m = 46.2$; female $m = 35.2$) (see table 8).

Discussions

The purpose of this study was to measure the level of physical strength and endurance of male and female students at a middle school that conducted daily physical education classes using the fitness gram scale and compare findings with another middle school that did not offer daily physical education classes for 6th and 7th grade students during the 2005 – 2006 school year. In this study it was hypothesized that (1) there is no significant statistical difference in physical strength and endurance between the pre- and post-test scores among the daily physical education students; (2) there is no significant

difference between daily and non-daily physical education students in level of physical strength and endurance; (3) there is no gender difference for fitness scores among daily and non-daily physical education students. The following were the main findings of these study; (1) students at the daily physical education school did not show improvement in physical fitness scores from the pre- and post-tests. (2) Students that did daily physical education differed significantly in the level of physical fitness in push-ups compared to non-daily physical education students, however, students with non-daily physical education performed better in curl-ups compared to daily physical education students. (3) In terms of gender, male students from daily and non-daily schools scored higher than female students in terms of push-ups. (4) Both male and female students at the daily physical education school had higher fitness scores than male and female non-daily physical education students. (5) Overall, male students from both the daily and non-daily physical education schools outperformed female students.

The pre- and post-tests scores for students at the daily physical education school shows stable levels of physical fitness. These findings might have been attributed to the climate and weather of the mid-west.

The pre-test was taken in November near the end of fall. Normally, during the fall students at the daily physical education school participate in extracurricular activities such as girls volleyball, football, and girls basketball. However, the post-test was taken at the beginning of spring. At this time students had started to increase their activity levels after a decline of physical activity during the winter season. Therefore, their level of physical fitness is reasonably high during the sport season. According to Kohl and Hobbs (1998), "seasonal and geographical influences play a large role in determining physical activity behaviors". Adolescents' physical activity levels are higher during summer and lower in the winter and increase again during the spring." (p.551).

These findings might be due to demographic differences between the two schools. There were more male student participants at the daily physical education school (46) compared to the non-daily physical education school (29). It is common knowledge that male students perform better in push-ups compared to female students. Other factors include race and the gender and socioeconomic environment of the students. These findings are consistent with those of Caspersen et al. (2000) who examined the data from the national interview surveys, using the 1992 youth risk behavior survey. The study compared physical activity patterns by sex and age. The findings indicated "the prevalence of adolescents reporting regular, sustained activity dropped 16 percentage points (40% to 24%) for male respondents and 10 percentage points (30% to 20%) for female respondents ages 12 to 17, then each essentially stabilized" (p. 1603). Gottlieb and Chen (1985), "reported a direct relationship between father's occupation and physical activity among seventh- and eighth-grade students. Moreover, there appears to be a clear ethnic difference in frequencies of reported activities, with Anglo students being more likely to report participation in individual (noncompetitive-type) activities than African-American or Mexican-American children." (p. 552).

The lower curl-up scores for the daily physical education school may be due to the socio-demographic factors of (1) racial diversity and (2) socioeconomic status. The socio-demographics of the daily physical education school and the non-daily physical education school were different. Racial diversity at the daily physical education school in 2005/2006 was 58% white and 42% non-white with half of the participants of this study being female.

Racial diversity at non-daily physical education school in 2005/2006 was 77% white and 23% non-white with half of the participants of this study being female. Gordon-Larsen et al. (2002) reported moderate to vigorous activity was highest for Asian and non-Hispanic white boys and lowest for non-Hispanic Black and Hispanic girls.

Socioeconomic status of the schools was quite different. Socioeconomic status is determined by free/reduced lunch. Free/reduced lunch at daily physical education school was 66.60%. Free/reduced lunch at non-daily physical education school was 37.80%. The district average for free/reduced lunch is 58.70%. Socioeconomic status indirectly relates to the physical conditioning of students. The high percentage of students on free/reduce lunch at the daily physical education school reflects an inadequate diet and nutrition. According to Kington & Smith (1997) and the US Health and Human Services (1995), "the higher prevalence of leisure time inactivity observed among minorities in the United States can be explained by differences in social class or have implied that the relationship between race, social class and disease could be mediated by behaviors such as physical activity"(p. 47). A lack of adequate physical conditioning due to lack of nutrition negatively affects the expenditure of energy during physical activity. According to Sallis et al. (2003) "because most adolescents in the United States do not meet guidelines for fat and fruit and vegetable consumption nor for physical activity, there is a need for effective interventions. Many such interventions have been evaluated, and most have been delivered through schools.

Environmental and policy interventions are the least studied component of school health promotion, but there are examples of effective environmental approaches. According to Ellison et al. (1989) improved the nutritional quality of foods served at schools. Environmental and policy approaches to enrich physical education classes have increased students' physical activity in class and out of school. Because students consume 25% to 33% of their daily energy and accrue 20% to 30% of daily physical activity at school, efforts to improve these behaviors on school campuses are needed and could have large cumulative effects (p.290).

Limitations of the Study

Although physical fitness testing can provide useful information of the fitness level of youth, this study had the following limitations. First, the daily physical education school fitness data was manually reported. The non-daily physical education school fitness data was reported using the Fitnessgram Version 6.0 software to students. Therefore, additional information was given to each non-daily physical education school student pertaining to their level of fitness and areas of improvement. The daily physical education school students received no written report of their physical fitness test results. Lastly, physical fitness data comparisons for eighth grade students were not included in the analysis of daily and non-daily physical education students. Excluding eighth grade students from physical fitness testing may not give an accurate measure of overall student fitness.

Conclusion

This research indicates that participation in physical activity, gender, and race affects the performance scores of students on fitness tests. Male students at the daily physical education school had higher fitness scores than both male and female non-daily physical education students. However, the females at the daily physical education school outperformed the females at the non-daily physical education school in push-ups only and had lower fitness scores than males. Overall, male students from both the daily and non-daily physical education schools outperformed female students. This is confirmed through a review of current literature and the results of this study. The short and long term recommendations would support a frequent evaluation of student fitness and the need to incorporate daily physical education in school curriculums.

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