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Health and Fitness Awareness in Schools and Student Impact: A Quantitative Study

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Health and Fitness Awareness in Schools and Student Impact: A Quantitative Study

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Submitted in Partial Fulfillment of the Requirements for the Degree

Master of Science in Education

School of Education and Counseling Psychology

Dominican University of California

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This thesis, written under the direction of the candidate's thesis advisor and approved by the Chair of the Master's program, has been presented to and accepted by the Faculty of the Education department in partial fulfillment of the requirements for the degree of Masters of Science on Education. The content and research methodologies presented in this work represent the work of the candidate alone.

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Abstract

The purpose of this study was to analyze whether or not schools can have an impact on student knowledge of health and fitness if they implement programs that educate students in that content area. This study gathered information, via student questionnaires, from two school sites, to compare student knowledge at a school that implemented a health and fitness program with one that did not. The review of literature focused on current and passed data that emphasized the need for educating society on health trends, resulting impacts of unhealthy lifestyles i.e. obesity rates and diabetes, and the best venue for addressing and making changes in current health trends. The resulting data confirmed the hypothesis: Student health knowledge is higher in schools that provide health/fitness programs than those that do not, to be true. The data was statistically significant revealing that site A (the intervention site) yielded an average of 83-86% knowledge in health and fitness awareness and site B an average of 40-43% knowledge in that subject area.

Introduction

This quantitative study gauged the effectiveness of a health/fitness program by assessing student knowledge through the use of an awareness scale. By measuring student awareness, this study provided evidence of the usefulness of an intervention program being implemented at the school of study. This intervention program is a University of California of Davis program that addresses diabetes prevention by educating students on two rising health epidemics, diabetes and obesity. This education process was conducted by the intervention group, an educated team that not only promotes awareness but encourages healthy food choices by providing a snack to students after they have been involved in a health/fitness lesson as well as participated in a full class physical activity. The purpose of this study was to analyze the effectiveness of one school's effort in promoting knowledge about healthy foods, the importance of staying physically active, and prevent health related diseases.

Background and Need

According to the Centers for Disease Control and Prevention (CDC), childhood obesity has more than tripled in the past thirty years and the percentage of children aged 6-11 years in the United States who were obese, increased from 7% in 1980 to nearly 20% in 2008. The percentage of adolescents aged 12-19 years who were obese increased from 5% to 18% over the same period. Also, in 2008, more than one third of children and adolescents were overweight or obese ("Childhood and Obesity," n.d.).

In light of this information, the relevance of having a fitness program seems to be an essential component in the education of today's youth. The school setting is perhaps one ideal place to make a positive impact on student health and fitness, due to the fact that

students spend the majority of their day in school. This study is an example of how a school setting can begin to address the health concerns of today's youth. It shows that through the process of education and learning by doing, student knowledge on the subject of health and fitness has the ability to be measured. By looking at one setting in which health and fitness awareness has been implemented and measured, this study shows that it is possible to bring awareness to current health concerns.

Statement of Problem

Schools have the opportunity to provide targeted education that addresses health and fitness concerns of today's youth. Obesity and the resulting health problems that can result from it "now affects 18 percent of U.S. children and adolescents" (Dietz & Robinson, 2008, p. 222). The youth of today will soon become health concerns in adulthood, resulting in a trend of unhealthy generations while also taxing the health care systems. This study analyzed current research that examines childhood health concerns and explores a possible solution to help address the growing need of educating today's youth on how to make healthy choices and live an active lifestyle.

Statement of Purpose

The purpose of this study was to measure student knowledge of health and fitness, such as knowledge of the macronutrients and how to classify foods into those categories. This project looked at a current health/fitness program being used at the school site of this study and how it impacted student awareness and knowledge of health and fitness. If such a program can demonstrate growth of student knowledge in health and fitness, more schools might see the value in having a health and fitness program. The program of this study is one example of how schools can address the physical inactivity and obesity

epidemic by introducing healthy foods, food knowledge, and fun physical activity. Building awareness is the first step in recognizing the problem.

Hypothesis

In this study the researcher examined how schools can have an impact on student knowledge of health and fitness. One of the schools implemented a program to improve student knowledge on this subject of health and fitness and the other school did not have such a program. The hypothesis was that students who attended the school with the health and fitness programs are more likely to be knowledgeable about food categories, calorie in-put and out-put, as well as the importance of physical activity for the body.

Theoretical Rationale

If one takes a look around and observes the physical state of today's youth as well as the food choices they make, it is visually evident that child obesity is on the rise. "The National Center for Chronic Disease Prevention and Health Promotion reports that the number of overweight young people--- children and adolescents aged six to nineteen years--- has more than doubled in the past twenty years" (Yaussi, 2005, p. 105). Addressing the issue of obesity and physical inactivity is a relevant concern for today's youth as well as for future children.

Since students spend around thirty hours a week in the school setting, schools have the opportunity to make an impact on student nutrition, education, and physical activity. However, "schools are unlikely to reverse the epidemic of childhood obesity by themselves, they are an important venue for prevention, in concert with a comprehensive communitywide effort" (Leviton, 2008, p. 38). Working in the school environment allows teachers to gain firsthand knowledge as to the diet students consume as well as influencing the daily activity that students participate in, thus making schools an

appropriate venue for addressing child obesity and inactivity. The purpose of this study was to show evidence that students who were provided with health and fitness education were more knowledgeable on the subject. A questionnaire was designed that consisted of questions which required students to have an understanding of foods, food groups, and the purpose of food. Some of the questions were common sense questions, while others required specific knowledge based on teaching. The assumptions about this study were that education on health and fitness would yield results that show student growth and knowledge in that subject area, whereas no education would result in no student knowledge in that subject.

Review of the Literature

This review of literature analyzes the need to incorporate health and physical awareness and promotion in schools in order to address the growing trend of child obesity, physical inactivity, and the resulting health factors. One such factor that is a growing concern that can stem from obesity is diabetes. Due to diabetes being a relatively new disease for children, the research is limited and thus the focus is predominantly on the effects of obesity rates in children and the currently new trend of diabetes rates in children. By examining the history of obesity, the effects of diabetes, ways to improve health trends, and the importance of physical activity, this review also examines previous research, to investigate how an impact can be made to improve the health and physical capabilities of today's youth.

Review of the Previous Research

Previous literature on the topic of childhood obesity and diabetes centers on the definitions of obesity, diabetes and obesity, education for youth in health and fitness, and actions taken in schools to improve physical activity and nutrition.

The qualifying parameters of obesity and history. Obesity can be difficult to measure especially in children. Due to sporadic data, loose definitions and results, difficulties can occur when determining what is standard or normal when it comes to health and obesity, especially in the realm of children who “are [still] growing, [and] the link between adiposity, or ‘true fatness’ and the ratio of their weight to their height may be looser than that of adults” (Anderson & Butcher, 2006, p. 20). Obesity itself is not a new phenomenon but the growing numbers of obesity in children is a relatively new and

growing epidemic; consequently, the ways in which adult obesity is measured has to be weighed carefully when applying those standards to children.

Body mass index (BMI) is a common way to measure adult obesity and overweightness, but the “use of BMI to assess overweight and obesity in children is more controversial” (Anderson & Butcher, 2006, p. 20). Though it may be controversial, the International Obesity Task Force, suggests that it still allows for “a reasonable measure with which to assess fatness in children and adolescents” (Anderson & Butcher, 2006, p. 20). Accordingly, age and sex are considered when determining overweight and obese factors when looking at the BMI of children. The rapidly growing numbers of what is considered obese in children is now beginning to compound. Looking at today’s unhealthy youth and projecting future health problems and health costs based on current health issues, might give reason for alarm. Today’s “obesity is both an urgent reality and an urgent threat to the nation’s health and economic well-being” (Dietz, Benken, & Hunter, 2009, p. 216). When looking at the obesity related death toll in the U.S., studies show that “obesity accounts for anywhere between 112,000 and 400,000 deaths annually” (Vojnovic, 2006, p. 67).

The monetary expenditure is significant, such that, “direct and indirect medical expenses in 1998 attributed to both overweightness and obesity may have been as high as \$78.5 billion (Dietz et al., 2009, p. 216). Furthermore, “the economic costs of obesity have been estimated at \$117 billion in the year 2000” (Vojnovic, 2006, p. 67). This increased expenditure in medical costs is in direct correlation with new obesity related diseases. Obesity related diseases that once only impacted adults are now also being seen in children and adolescents. While many researchers agree that the obesity epidemic must

be addressed, they also agree that it is a complex issue to address in that “both genetic and behavioral factors are involved in determining human body weight” (Vojnovic, 2006, p. 67). This new phenomenon is putting a lot of questions on the table as well as new occurrences such as rising health costs and adult related obesity trends seen in children.

Resulting effects of obesity: diabetes. The correlation between obesity and diabetes is evident as “adiposity is a major determinant of type 2 diabetes in children and adolescents and is the most relevant modifiable diabetes risk factor in youth” (Tompkins, Soros, Sothern, & Vargas, 2009, p. 286). According to some studies, the solution to preventing diabetes can be relatively simple. Physical activity and a healthy diet are key components to lessening diabetes such that “diet, [and] physical activity is a proven form of diabetes management and is considered a cornerstone in the prevention of diabetes” (Tompkins et al., 2009, p. 286). This in turn might support the idea that if students spend the majority of their day at school and take in the majority of their calories in the school setting, the school might be one possible arena for introducing a healthy diet and lots of physical activity opportunities. One solution to this complex issue is, “reducing overweight and impaired glucose tolerance with increased physical activity and healthier eating habits may help prevent or delay development of type 2 diabetes in high-risk children and adolescents” (Tomkins et al., 2009, p. 287). The connection between obesity and one of its resulting consequences, (i.e. diabetes) is evident in that “as a result of obesity, it is estimated that this generation of young people will be the first expected not to live as long as their parents, and for children born in 2000, the lifetime risk of developing diabetes is estimated to be 30% in girls and 40% in boys, if nothing is done” (Bobo, Shantz, Kaufman, & Kollipara, 2009, p. 282).

Possible solutions. Tackling the overweight and obesity dilemma is a growing concern due its compounding nature for “the rapidly increasing prevalence of childhood obesity and its disproportionate impact on severe obesity in adulthood emphasize[s] the need to develop appropriate preventive and therapeutic methods for children and adolescents” (Dietz & Robinson, 2008, p. 222). Obtaining valuable and usable data has proven to be challenging for various reasons. Some being that “most studies found no strong evidence that interventions prevented weight gain or obesity, and many studies were limited in design, duration, or analysis” (Kipping et al., 2008, Part 2, p. 984). None-the-less, despite incomplete and sporadic studies, the issue of children’s health is still a concern, so much so that, “a survey of state health department chronic disease directors...rated school-based approaches as the highest priority to prevent childhood obesity” (Leviton, 2008, p. 39). The escalating numbers of obesity has “federal and state policy makers...requiring changes to make the school environment conducive to preventing obesity” (Leviton, 2008, p. 39), saying that “The environmental factors in school seem readily apparent and somewhat easier to change than the many forces in communities that are contributing to the problem” (Leviton, 2008, p. 39).

Hence, the possible solution areas that might be considered in addressing the improvement of student health and fitness could be: environment, education, community, resources, economics, and viability. By ensuring the success of overweight and obesity prevention, “a successful approach to reducing obesity and its comorbidities must also embrace understanding of community-level factors including the social, built, and natural environments” (Trasande et al. 2009, p. 159). The big question is who can make the most amount of change in the best possible environments? Research shows that “there is also a

public perception that schools should initiate efforts to prevent childhood obesity [such that] a recent national poll revealed that 87 percent of respondents believed schools should address the problem” (Leviton, 2008, p. 39). Not only is the environment a key factor but “the fight against obesity involves the intervention of many different players: children, parents, teachers, doctors, psychologists and production companies” (Madorell, Teran, & Ullmo, 2005, p. 288). The fact that this disease involves many parties is well known, so much so that the National Summit on Legal Preparedness for Obesity Prevention and Control targeted “four intervention settings...communities, medical care, schools, and workplace” (Dietz et al. 2009, p. 217).

Though we know it takes many to make a change, “public views about childhood obesity revealed varying degrees of support for prevention programmes” (Hilbert, Rief, & Braehler, 2007, p. 585). Health and fitness education in schools provide the opportunity to foster body awareness. By educating students about how to take care of their bodies, schools are giving students the opportunity to make educated decisions regarding food and exercise. Even though the results of health and fitness intervention are inconclusive, the very fact that schools are willing to give the power of knowledge by educating students on the choices they have, perhaps the mortality rate and money expenditures can decrease. Education on living healthy and staying active has an ideal setting, the school. Children are in school for the majority of the day and “school foods are a significant source of calories and nutrition for children and adolescents as they consume a significant portion of their daily caloric intake while at school” (Brescoll, Kersh, & Brownell, 2008, p. 180). In conjunction with addressing the healthy food choices that schools could make to improve children’s calorie intake, it is also important

that schools have sufficient means for calorie output in the form of physical activity. Because “schools are central to children’s lives, it is important to consider how they can be built to support physical activity” (Sallis & Glanz, 2009, p. 130). By addressing the overweight and obese issue in the school setting, perhaps progress can be made by changing the course of the lives of these soon-to-be adults. It is evident that “the rapidly increasing prevalence of childhood obesity and its disproportionate impact on severe obesity in adulthood emphasize the need to develop [an] appropriate” (Dietz et al. 2008, p. 222) solution. By having schools address this health concern in its infancy, not only will schools reap the benefits but so shall the economy and most of so shall today’s youth and the generations to come. This educational process has the potential to have a compounding affect that benefits the present as well as looks out for the future.

Summary of major themes.

It is evident that there is a lot of research that has been done and continues to be done in order to address the severity of overweight and obese children. The research indicates that in order to address this issue, certain areas of focus are the key regions in which change should take place, i.e., communities, the medical realm, schools, and the work place. It is also evident from the research that some of the data gathered is not always exact but rather gives a general idea of what the obesity dilemma is, especially pertaining to children. However, enough research states that the severity of overweight and obesity is an apparent problem that impacts all of us especially in the sphere of health, morbidity rates, and economic costs. Because of the toll that this disease is taking on the lives of many (especially the young) and the escalating monetary costs as well, researchers deem this an urgent field of study. The availability of research on the subject

of overweight and obesity is ample and continues to undergo analysis despite any inconsistencies that may arise. It is more than evident that the severity of this disease needs interventions to be established and implemented in order to increase the mortality rates, healthy lifestyles, better food choices, and decrease health costs and economic expenditures.

How present study will extend literature.

This study extends the research by showing one school's attempt at addressing the need to educate students on health and fitness and measuring that knowledge through the use of a questionnaire. The purpose of this study was to analyze the effectiveness of health and fitness education in the school setting and its measurability. Student awareness was measured by comparing a group of students who received a health awareness and fitness intervention with a group of students who did not receive the intervention.

Methods

The focus school for this research project incorporated a community program into the school setting that addresses the value of living a healthy life, staying active, and eating well. The program educates students on the “science” of food, and what makes it healthy, in conjunction with the importance of staying fit. As well as educating them about health and fitness, students then also participate in a physical activity. The lessons culminate with a snack of consisting of healthy food examples. This study measured the effectiveness of this program on students’ knowledge about healthy foods. This knowledge was measured through the use of anonymous questionnaires conducted at the school of this study as well as that of another school that did not have a health education program.

Sample and Site

This research project was conducted at two school sites, one of which implements a health and fitness program, and another that does not. Questionnaires were given to students in grades four through six at both schools. Student ages varied from eight years of age to thirteen years of age. Because the investigation was designed to look at students in a specific school program and compare them with students in a school that lacked such a program, purposive sampling of preexisting groups was the method chosen. To operationalize the variable, an anonymous questionnaire was used to measure student knowledge about health and physical fitness. The questionnaire was distributed at two schools, one of which included sixty students and the other ninety students. The school sites chosen had similar demographics in terms of the socioeconomic factors, such as low

income families, job instability, and 80-100 percent free and reduced lunch. School Site A (with the fitness program) has a high population of American Indians (73%), Hispanics (19%), and White (8%). Site B (without the fitness program) has American Indians (1%), Hispanics (30%), White (54%), Asian (.1%), Pacific Islander (.1%), Filipino (.1%), African American (3%), Two or more races (10%), and not reported (1%).

The site of which this study focuses on has been implementing a health and fitness program in the school setting. The purpose of this program is to deliver a short lesson on health related issues (i.e., food, diseases, prevention, exercise, etc.), create a venue for physical activity, and provide an example of a healthy snack. The school of this study has been implementing a health and fitness program in order to address the high diabetes and obesity rates in the community.

Access and Permissions

All data was gathered during regular school hours via the anonymous questionnaire. Permission was obtained from principals and teachers of both sites. The Dominican University Institutional Review Board for the Protection of Human Subjects granted permission for the research to be conducted in the classrooms.

Data Gathering Strategies

The purpose of the study was to compare student knowledge of healthy behaviors at two schools—one with a health/fitness program, and one without. The “treatment” in Site A was the health/fitness program and the other school, Site B, was the control group that did not have a health/fitness program. Questionnaires were distributed at the end of

the spring semester of 2013. The questionnaire was composed of a set of ten questions that required students to be able to either give a written response or select an answer from a few choices. The reason for these types of questions was to determine how much knowledge students had about healthy lifestyles. This same questionnaire was administered at both sites A and B. The information from Site A (Health Program) was then compared with that of Site B (No Health Program). Once the questionnaires were gathered from both sites they were then evaluated to determine student knowledge. The function of the questionnaire was to obtain measurable data from both sites for statistical comparison.

Data Analysis Approach

This research project aimed to quantify the value of a school's health and fitness program via student questionnaires, with that of another school with no health and fitness program. The goal in doing this research project was to evaluate the results of the two schools in order to show the impact of health education on that of student health knowledge. After the questionnaires were distributed, they were assessed on a scale of zero to hundred. The higher the score earned by the students indicated their level of health knowledge.

Data gathered from the two groups was evaluated using a *t* test in order to determine whether there were significant differences in health knowledge of students attending the two schools. If the null hypothesis (that there is no difference between the groups) is rejected, then we can assume that the health program is successful in increasing student health knowledge.

Ethical Standards

This study adheres to Ethical Standards in Human Subjects Research of the American Psychological Association. (Publication Manual of the American Psychological Association, 2010).

Findings

After having conducted this study and analyzed the data, the findings indicate that the results correlate with the research hypothesis which states that student knowledge about health and fitness is higher in schools that provide education on that subject than schools that do not. The findings show that the difference in student knowledge as measured by the questionnaire was statistically significant. This study looked at one program within the school setting to see if it had an impact or not on increasing student knowledge about health and fitness. By comparing the results of the two schools it provides evidence that supports the hypothesis that students who participate in a health education program in school will have more knowledge than students that do not.

Description of Site, Individuals, Data

School site A provided fifty-four student completed questionnaires and site B provided eighty-three. The questionnaire was given to grades four through six. Despite the sample size differences between the sites, the results yielded that site A, the intervention group with a health/fitness program, scored higher than that of site B, the school with no health/fitness program. Between site A and B there was an overall

significant difference ($T=12.93$ $P= <.0001$), refer to Table 1. After both sites participated in this questionnaire, site A students had a significantly greater amount of knowledge than site B students. In terms of grade level significance the P-Value was less than .0001, demonstrating statistically significant difference in terms of grade level results as well (Refer to Table 2).

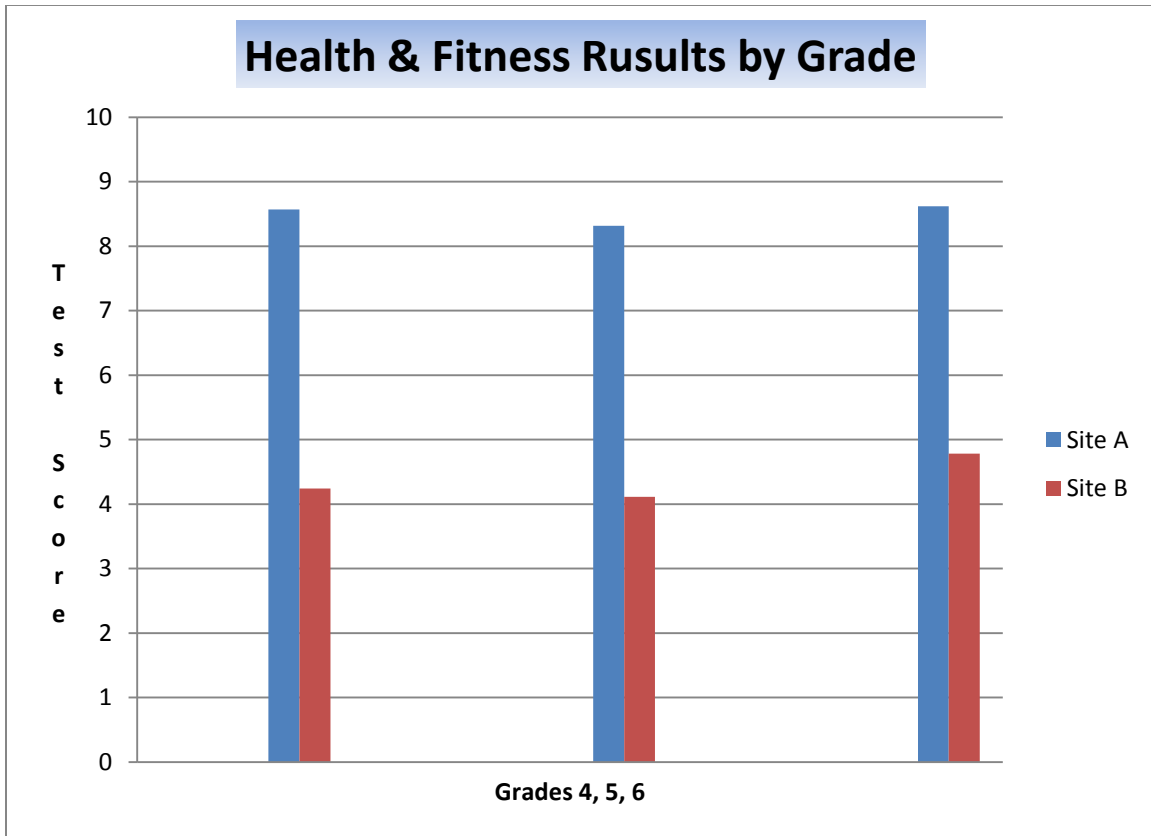


Table 1

Mean Scores by Grade Level

| <u>Grade</u> | <u>Site A</u> | <u>Site B</u> |
|---------------------|----------------------|----------------------|
| 4 th | 86% | 42% |
| 5 th | 83% | 41% |
| 6 th | 86% | 48% |
| Overall | 85% | 44% |

Table 2

Analysis of Themes

The purpose of this project was to analyze the following hypothesis: Student health knowledge is higher in schools that provide health/fitness programs than those that do not. After having looked at the data from the intervention group site A, and the non-intervention group site B, the results confirmed the hypothesis to be true. The intervention program at site A confirmed that students who are provided with health/fitness education have a higher knowledge than those that do not. The data revealed that site A results yielded an average of 83-86% knowledge in the subject area, whereas site B had an average of 40-43% knowledge.

Discussion

This study is another piece of the conversation about health that is taking place currently. Past research has looked at the various ways to address the health and fitness concerns of children. Many ideas are being implemented and tested to determine the best course of action to promoting healthy youth. This study is an example of how schools can

be the catalyst for making a healthy change in their student population. By initiating this process, schools have the potential of seeing a ripple effect that might impact the community, business enterprises, and perhaps eventually reach a global scale. The findings of this study revealed that a health intervention program in a school setting can have a significant result on student knowledge. The findings when compared to that of a school that lacked the intervention, showed a high rate of success in this study and future potential steps that this study can take to make a greater and lasting impact on student health and fitness.

Comparison of Findings with Existing Studies

This study builds on previous research by showing that if students are given the opportunity to be educated about health and fitness, then student knowledge will increase. The results indicated that the increased student knowledge was significant when compared with students who did not receive this intervention. When looking at existing studies that emphasized the importance environment can have on increasing student awareness, this research showed one school's attempt and the positive results as exemplified through the analysis of the questionnaires. Thus supporting previous studies that indicate schools as being one potential environment to conduct such an intervention "since more than 97 percent of children five years and older spend six to eight hours a day there for nine to ten months a year" (Leviton, 2008, p. 39). This study showed that a health and fitness intervention program has a strong possibility of bringing about increased knowledge about food and fitness, thus creating a platform for future forms of intervention that could lead to significant health changes in student populations. The argument that students spend the majority of their time in school correlates strongly with

the importance of providing the opportunity to affect change in student diet and activity choices. Previously mentioned in the literature review was the notion that health interventions do not have an impact and that past research about obesity preventions and interventions lacked reliability due to the inconsistency of the interventions and data collected. However, “recent innovations for school programming and experiences in policy reform suggest that the obstacles to changing the environment are not as great as we feared, and some perceived obstacles are not well founded in actual experience” (Leviton, 2008, p. 39). Though the results of this research are miniscule when looking at the data gathered, it is a micro example of what could be possible on a macro scale. The fact that knowledge gained was significantly evident and that the intervention was significantly successful in increasing student knowledge about health and fitness is just an example of how one attempt was made at bringing awareness to health and fitness.

Limitations of Study Limitation

One limitation of this study would be sample size in that the total data collected was from a sample size of 137 students. Another limitation was that the groups were not random but rather a specific sample. It was therefore not a true experimental design because the study was looking for specific information and not randomly recruited samples.

Implications for Future Research

This study could increase its sample size by incorporating more grades as well as more schools. The intervention could be implemented in different schools after students are given the questionnaire so that growth could be measured prior to intervention and after in order to measure student knowledge progress. By increasing the sample size the

confidence level would increase thus increasing the validity of this study. As this initial process was implemented at schools, they would then have base line data that would help them determine what steps to take next. This intervention also has the potential of expanding out into the community and the school could be a conduit for providing a space for families to participate in this process via health lessons, healthy food preparation classes, providing healthy activity options, and healthy food samples. This study could be expanded by looking at and measuring the long-term affects that a health and fitness program might have on kids as they get older. It could measure whether students make dietary changes as well as increase physical activity because of their increased knowledge.

Overall Significance of the Study

This study showed evidence that educating today's youth on health and fitness can result in a significant amount of knowledge. Having measured student awareness of health and fitness, the intervention school now has the opportunity to see data that shows what is working and what might be added; allowing the program to continue in advancing itself in order to meet the needs of the students. By comparing the test results of a school with a fitness and health program and one without, the researcher was able to show that student knowledge on health and fitness is significantly evident when students are provided with the right tools. This study adds to existing studies by showing results that support the idea that students' knowledge base on health related issues can significantly grow when exposed to educational lessons.

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Appendix A

Health and Fitness Questionnaire

Grade:_____

Date:_____

This questionnaire is a tool to measure your knowledge about how to make healthy lifestyle choices. Some questions you might know some you may not. Please answer to the best of your ability. This questionnaire does not impact your class grade.

****DIRECTIONS****Please circle or write your answer in the space provided for the following questions.

- 1.) Name (3) green vegetables (write your answers in the space provided).

- 2.) Which of the following lists contain the three macronutrients? (Circle the correct answer).

- a. milk, rice, carbohydrates
- b. protein, carbohydrates, fats
- c. fats, chicken, salad
- d. carbohydrates, oil, water

- 3.) Please write one example of a food that is a carbohydrate.

- 4.) Now, write one example of a food that is a source of protein.

- 5.) Write one example of a food that is a healthy source of fat.

- 6.) As far as you know, if you eat more calories than you burn, what will happen to your body?

- 7.) Name TWO dairy products:

- 8.) Rice is a:
a. Carbohydrate
b. Fat
c. Protein
- 9.) Chicken is a:
a. Carbohydrate
b. Fat
c. Protein
- 10.) Peanuts are a:
a. Carbohydrate
b. Fat
c. Protein

Thank you for participating in answering the following questions!