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Improving Physical Fitness in Elementary School Students

Caroline Fortson

IMPROVING PHYSICAL FITNESS IN ELEMENTARY SCHOOLS STUDENTS

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Abstract

With childhood obesity rates rising across the country, promoting physical fitness is more important than ever. Today's children are developing increasingly sedentary behavior. The average American elementary age child spends their day at school and the classroom is a source of the progressively sedentary behavior. Compounding the problem, schools are reducing the time allotted for physical education and recess, which means more time is spent sitting at a desk in the classroom. A rising number of children are reporting feelings of stress and anxiety, which may be alleviated by a physical activity such as yoga. Yoga may be an efficient method to increase physical activity and improve overall health. The purpose of this study is to determine the impact of ten minutes of daily yoga on physical fitness of students in kindergarten through third grade. The researchers conducted a quantitative analysis of the differences between physical fitness before and after exposure to a program entitled "Yoga for Kids". Participants completed the Eurofit Test at the beginning, middle, and completion of 16-weeks of ten minutes of daily yoga. Results showed no significant improvement in the sit and reach, sit ups, left flamingo, and left handgrip. There was a significant improvement in the broad jump during the first eight weeks; however, there was minimal improvement from the eight-week mark to the conclusion of the study. The hypothesis was rejected. Further research should be conducted to determine what amount of time could make a meaningful impact on the physical fitness of the elementary school student.

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Introduction

Yoga is becoming an increasingly popular exercise for both adults and children because of the benefits to overall health (Ross, Friedmann, Evans, & Thomas, 2013). Research shows that yoga improves physical and mental health with minimal reported adverse effects (Ross et al., 2013). This study examined the benefits of yoga on physical fitness and aimed to improve well-being in the classroom through practicing yoga based on the documented positive results, including decreased anxiety, improved classroom behavior, increased coping skills, and improved overall physical health.

Background & Significance

With childhood obesity rates rising across the country, promoting physical fitness is more important than ever (Eggleston, 2015). Today's children are developing increasingly sedentary behavior. The average American elementary age child attends school for approximately seven hours a day, and the classroom is a source of the progressively sedentary behavior (Brittin, Frerichs, Sirard, Wells, Myers, Garcia, & ... Huang, 2017). Compounding the problem, schools are reducing the time allotted for physical education and recess, which means more time is spent sitting at a desk in the classroom. A rising number of children are reporting feelings of stress and anxiety, which may be alleviated by a physical activity such as yoga (Eggleston, 2015). Yoga may be an efficient method to increase physical activity and improve overall health (Telles, Singh, Bhardwai, Kumar, & Balrishna, 2013).

Literature Review

Yoga is an exercise that works the entire body, utilizing a variety of poses that are practiced to target specific goals. Yoga can be practiced by anyone, regardless of age or sex, including those who are overweight. There are certain medical conditions, such as pregnancy

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among others, which require an adjustment of poses. If yoga is performed correctly, it can lower the resting heart rate, increase flexibility, lower anxiety, and alleviate discomfort from a range of medical conditions (McGill, 2015). Yoga has relatively few adverse effects, but the exercise has been associated with strokes and nerve damage (McGill, 2015). With the popularity of yoga rising, elementary school children are a particular demographic that can benefit from the practice. The average elementary student in the United States reports feeling stressed and spends more time sitting still than being active (Eggleston, 2015). Yoga can improve cognition, behavior, self-esteem, anxiety, and overall physical fitness in children who participate (Telles et al., 2013). Yoga is considered a valuable exercise and it needs to be evaluated to determine if it can be easily performed in small time increments in the classroom.

A literature review by Khalsa and Butzer (2016) noted 47 published trials regarding yoga in the public school settings in peer-reviewed journals. The majority of the published journals were published after 2011. Based on the study criteria, Khalsa and Butzer (2016) deemed that research on yoga in elementary schools is in its “infancy”. Khalsa and Butzer (2016) concluded by advocating for more research proving the feasibility, efficacy, and cost-effectiveness of yoga in the classroom so that widespread implementation can occur in classrooms across the country. Although similar studies have been conducted, their small sample sizes and multiple variables evaluated make them difficult to correlate. A study by researchers Telles, Singh, Bhardwaj, Kumar, and Balrishna (2013) measured the effect of yoga on physical, cognitive, and emotional health in children. Physical exercise was also compared to determine its effectiveness versus that of yoga. Students participated in 45 minutes of yoga per day for five days over a period of three months (Telles et al., 2013). The Eurofit test was used to measure the students’ physical fitness before and after the program. Results indicated students increased the number of sit-ups and

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improved their balance after three months of practicing yoga (Telles et al., 2013). A similar study by Verma, Shete, & Thakur (2014) tested a 12-week exercise program in rural residential school students. The study consisted of eighty-two male students, ranging from ages 11 to 15, that were divided evenly into an experimental and a control group. Students practiced yoga for 45 minutes five days a week at their school. Physical fitness measurements were taken at the beginning and end of the 12-week program. These measurements consisted of grip strength, flexibility, and abdominal strength. The study revealed that flexibility, grip strength, and abdominal strength each improved in the experimental group at the conclusion of the program.

The effect of yoga for 45 minutes, twice a week, for three months was evaluated using the Eurofit test as a tool to measure the changes in physical fitness with results showing a positive change in balance, running speed and agility, and strength and flexibility (Folletto, Pereira, & Valentini, 2016). Even though Folletto et al. (2016) cautioned that there is a lack of literature showing the effects of yoga on strength and agility, overall, the study found yoga as a promising potential educational tool in the development of children (Folletto et al., 2016).

In conclusion, yoga is becoming increasingly popular because of its therapeutic effects on improving emotional, mental, and behavioral health. Yoga also improves overall physiologic health (Mind-Body Therapies in Children and Youth). Many previous studies have employed multiple fitness variables and small sample sizes; therefore, further research is needed to directly examine the connection between the benefits of yoga and children (Mind-Body Therapies in Children and Youth).

Hypothesis and Purpose of the Study

Based on the review of literature, the hypothesis was that there will be a significant increase in physical fitness among elementary school students who performed ten minutes of

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yoga each day in the classroom setting for a 16-week period. The purpose of this study is to determine the impact of ten minutes of daily yoga on physical fitness in students enrolled in kindergarten through third grade.

Design & Methodology

This study evaluated whether participation in weekly yoga improved physical fitness as determined by measuring flexibility, core strength, and balance in the elementary school student. The Eurofit test was used as a tool to determine the changes in physical fitness in the participating children over the 16-week period in which the students were practicing yoga in the classroom. The Eurofit test is a popular tool used in research that evaluates motor fitness, such as flexibility, balance, and core strength. Reproducibility and validity of the Eurofit test was established in a study by Fjørtoft (2000), which used the test to evaluate motor fitness in children ranging from ages five to seven. Students in the study were measured on the following activities: the flamingo balance, sit-and-reach, standing broad jump, and sit-ups (Fjørtoft, 2000). Additional measurements included weight, height, hand strength, and waist circumference.

The study was performed following approval by the University of Arkansas Institutional Review Board (IRB) and by consent of Eureka Springs Elementary School in Eureka Springs, Arkansas. The pre-test/post-test quantitative study determined if participation in weekly yoga increases flexibility, core strength, and balance in the elementary school student. A total of 82 kindergarten through third grade students who were able to read and speak English and had no physical limitations participated in the study. Data was collected on the students' physical fitness as measured by the Eurofit test to evaluate strength, flexibility, and balance prior to and at the conclusion of the 16-week period. Additionally, data was gathered at the eight-week mark of the 16-week period. The elementary school in Eureka Springs, Arkansas was included in the study

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due to its close proximity to the University of Arkansas campus and the willingness of the administration to allow the students to participate. Teachers received yoga instruction prior to the beginning of the study and led the class activity during the 16-week period. Data collection periods included a preliminary collection of data in August of 2017, a collection after eight-weeks of the study, and a final collection following the conclusion of the 16-week period. The purpose of the eight-week data collection was to note whether improvements continue to occur or if the results plateau.

Preliminary Suppositions & Implications

If the study follows the expected trend, it is anticipated that yoga will increase the overall fitness of students participating in the study. With the decreasing amount of time allotted to physical fitness and recess, and the steady increase in childhood obesity rates, ten minutes of yoga a day in the classroom, amounting to fifty minutes of yoga a week, could be a simple yet beneficial exercise to improve fitness of elementary school students. If the expected positive results materialize, ten minutes of yoga will be easy to implement into the daily classroom schedule. By providing yoga mats, students can practice yoga without having to leave the classroom. The small amount of time spent practicing yoga will result in meaningful results in the healthy lifestyles of participating children.

Statistical Analysis

A repeated measure MANOVA was performed to see if there were any time differences between the five scales, which consisted of the sit and reach (SR-1), sit ups (SU-2), broad jump (BJ-3), left flamingo (FlaL-4), and left hand grip (HGL-5). The overall test of measure*time was significant, indicating that at least some of the measures functioned differently over time from

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each other, $F(10, 50) = 3.71$, $p = .0009$. Follow up tests were performed with an alpha of .005 to see where the differences occurred.

Results

A p-value of .05 was used initially but an alpha of .005 was used to eliminate false significance. With an alpha of .005, the only significant difference between measures and time points was the difference in broad jump from the first time point to the third time point, $F(1, 59) = 21.83$, $p < .0001$. This is significant because it has a p-value of $<.05$. There was also a difference in broad jump between the second and third time point, $F(1, 59) = 11.19$, $p = .0014$. However, the first and second time points seem similar and, therefore, were probably not significant from one another. The mean for first time point for broad jump is 36.0167, second time point mean is 37.783, and the third is 41.95. This indicates that the broad jump increased throughout the class. The difference between first and second time point was minimal. However, there was a significant gain in the broad jump between the second and third time points. None of the other physical measures changed over the course of the study.

The study consisted of a sample size of 82 students. Students participated in the Eurofit test and physical measurements were taken at the beginning of the study, eight weeks into the study, and at sixteen weeks, which concluded the study. Students were measured on the sit and reach, sit ups, broad jump, flamingo stand, and hand grips. Height, weight, and waist circumference were taken as well. The initial, eight-week, and final data collections served as the three time points.

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Contrast Variable: time_1*measure_3					
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	2112.266667	2112.266667	21.83	<.0001
Error	59	5707.733333	96.741243		

Figure 1: Broad Jump between 1st & 3rd time points.

Contrast Variable: time_2*measure_3					
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	1041.666667	1041.666667	11.19	0.0014
Error	59	5490.333333	93.056497		

Figure 2: Broad jump between 2nd & 3rd time points.

Limitations

Limitations in this study are that the population is a self-selected sample rather than randomized, and the study is looking at one region of the country. An additional limitation is that a small, rural school district was examined. This study required teacher participation, as they were to dedicate ten minutes of each day to leading the class in yoga. Teacher participation was another limitation in this study. This study lacked a control group to serve as a comparison for the data.

Discussion

This study examined whether ten minutes of yoga a day could have a significant beneficial effect on the physical fitness of elementary school students. The study was important because, if there had been a significant positive effect, allotting a short amount of time each day for exercise is something that could easily be implemented in the classroom setting and make a positive impact on the child. Because the study revealed that ten minutes of yoga a day only made a significant positive effect on the standing broad jump measurements of the students, it is

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imperative that more research be done to examine the amount of time practicing yoga that can have a more meaningful impact on the student.

With increasing rates of childhood obesity in the United States, it is crucial that children become more active. A push for improved physical fitness needs to be made to decrease childhood obesity and the negative effects associated with it. It has been found that childhood obesity can lead to hypertension, abnormal lipid levels, metabolic syndrome, type 2 diabetes, asthma, sleep apnea, joint pain, back pain, liver disease, gallstones, pancreatitis, menstrual abnormalities, and severe headaches (Obesity and the Risk of the Disease, n.d.). Childhood obesity has been found to have both an emotional toll and a physical toll on the child. It has been associated with a negative social stigma, low self-esteem, bullying, emotional eating, and depression (The Emotional Toll of Obesity, 2017). Additionally, it has been found that obese children have poorer academic performance and a lower quality of life (Sahoo, Sahoo, Choudhury, Sofi, Kumar, & Bhadoria, 2015). Childhood obesity has been directly linked with sedentary behavior, which is one of the most significant risk factors (Sahoo et al., 2015). As mentioned before, the classroom is becoming an increasing source of sedentary behavior in elementary school students due to a decrease in time devoted to physical education and recess.

There are an alarming number of negative adverse effects associated with sedentary behavior and childhood obesity. It is crucial that these negative effects be addressed for the benefit of students across the country by improving mental and physical health. By practicing yoga in the classroom, children will have the opportunity to become more active. Children spend five days a week at school during the school year. Schools are a place of learning, and academic subjects should not be the only things they are taught. Taking care of oneself, in regards to physical health along with mental health, is an important part of living a healthy life. By

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addressing the physical and mental health of students in the classroom, students can learn ways to care for themselves that will have a lasting impact. Yoga can be taught without even leaving the classroom and yoga mats are the only supplies needed. It is a simple way to incorporate exercise, and as discussed before, has documented benefits on physical fitness and emotional well-being. Not only is it easy to implement into the classroom, it is also something that the student can continue to practice outside of the classroom on his own. Practicing just ten minutes of yoga a day revealed a significant improvement in the standing broad jump and it is important for further research to determine the amount of time required to make a meaningful impact on other aspects of physical fitness in children so that yoga may be incorporated into schools and classrooms across the nation.

Conclusion

Yoga is a simple exercise that increases strength and has been found to be a beneficial exercise in improving physical fitness. Yoga can be practiced anywhere, from the home to the gym to the classroom. The purpose of the study was to determine if small time increments of yoga each school day could improve physical and mental health in an elementary school student. It was important that this be examined due to the increasing sedentary behaviors and obesity rates in elementary students, and the decrease in time allotted to physical education and recess during the school day. Using the Eurofit test, the effectiveness of yoga on physical fitness was examined prior to, at the eight-week mark, and at the conclusion of the 16-week study. The determinants of physical fitness in the elementary school child included flexibility, core strength, and balance. The study revealed that ten minutes of yoga per day for 16-weeks had a significant positive impact on the standing broad jump measurement of elementary school students. Further research should be conducted to determine what amount of time devoted to yoga could make a

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meaningful impact on the physical health of an elementary school student. Research should be performed using a larger sample size and a larger region of the country. Future research may provide data that supports the implementation of yoga in classrooms throughout the country.

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