STRENGTHENING PHYSICAL FITNESS THROUGH SWIMMING ACTIVITIES FOR PRIMARY SCHOOL STUDENTS IN CHOM BUENG DISTRICT, RATCHABURI PROVINCE

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Abstract

The objectives of this experimental research were to: 1) assess the impact of swimming on physical fitness for primary school students, and 2) compare the fitness outcomes between an experimental group and a control group after 15 weeks of training. The sample comprised 60 students from grades 5 to 6 in Chom Bueng District, Ratchaburi Province, divided equally into experimental and control groups. The Department of Physical Education's fitness test and a swimming program for upper primary pupils, validated with a consistency index of 1.00, were used as research instruments. The data analysis utilized frequency distribution, percentage, mean, standard deviation, and t-test.

The research results found that (1) the experimental group showed significant improvements in physical fitness after the training. Specifically, body mass index was proportionate, flexibility was moderate, arm and upper body strength and endurance were good, and cardiovascular endurance was excellent. All improvements were statistically significant at the 0.05 level. (2) After training, the experimental group has substantially increased in cardiovascular endurance, arm and upper body muscle strength, flexibility, and over the control group. However, there was no discernible difference in the groups' body composition or the strength and endurance of their abdominal muscles. The new knowledge shows that swimming activities with learning behavior created in this

research reflect cultural influence, especially in educational practices in specific ways, including the interactions among teachers, students, and their parents.

Keywords: Cultural Preference; Learning Behavior; Strengthening Physical Fitness; Swimming Activities

Introduction

The study of movement is related to human existence, life, and coexistence in society. Education does not focus solely on knowledge and intellectual development. Complete education must promote human development in all aspects, namely intellectually, physically, mentally, emotionally, and socially, and the ability to live happily in society. Appropriate physical activities are one part that contributes to that development. The organization of the physical education process focuses on physical fitness and various organs of the body, allowing students to grow and develop physically to their fullest potential. The emphasis is on building physical fitness, and mental strength, and adapting to society. Elementary school students are at an age where physical changes begin to enter adolescence. This is considered the best period for training to adjust or strengthen physical fitness. Elementary school students should receive training with programs that provide appropriate stimulation to strengthen physical fitness and create complete physical maturity, which is the core of the development of elementary school students.

The school-Adolescent Health Group, the Health Promotion Bureau, the Department of Health, and the Ministry of Public Health surveyed the health status of students in Thailand in 2021. The results of the surveys indicated the overweight and obesity status of Thai students. 1 in 5 Thai students are overweight and 6.8 percent of students are obese. This group of students is at risk of becoming obese adults and also increases the risk of chronic diseases. Overweight and obesity in children are caused by an imbalance of energy intake from food and energy expenditure due to eating high-energy foods; high in fat and sugar and insufficient physical activity. The survey found that students had a low level of adequate physical activity. Overall, less than 1 in 5 students, 18.3 percent, had adequate physical activity (a total of not less than 60 minutes per day for 5 days or more during the 7 days before the survey). Male students had

more adequate physical activity than female students. Overweight in children is a risk factor for various non-communicable chronic diseases. It is also associated with obesity premature death and disability in adulthood. In addition, children who are obese have an impact on both mental and physical health, such as difficulty breathing and high blood pressure. Insulin resistance, etc. (Phuprasom, N., 2022).

Swimming is a physical education activity included in the curriculum. It is useful and important. By having children develop swimming skills, it also helps alleviate the problem of drowning in school-aged children. It is a movement that requires the usage of all the body muscles for a long period. It makes the circulatory system and respiratory system work more efficiently. Swimming is an activity that develops physical, emotional, social, and intellectual aspects in primary school students, strengthening the body without the impact risks associated with land sports. This study focuses on enhancing the physical fitness of primary school students in Chom Bueng District, Ratchaburi Province, through swimming activities. The goals are to assess the impact of swimming on physical fitness and compare the outcomes between an experimental group and a control group after training. The research aims to create a swimming activity program that effectively enhances the physical fitness of primary school students.

Research Objectives

1. To study the effect of enhancing physical fitness with swimming activities of primary school students in Chom Bueng District, Ratchaburi Province.

2. To compare the effect of enhancing physical fitness with swimming activities of primary school students between the experimental group and the control group after training in swimming.

Literature Reviews

Yookhong, D. (2016) studied the impact of Boy Scouts' exercise programs on the physical fitness of grade 4-6 students at Ban Thungmon School, Uthai Thani Province. The objectives were to assess the effectiveness of these

exercises and compare students' physical fitness before and after the program. The sample included 46 students from the 2015 academic year who did not meet the physical fitness standards for Thai children aged 7-18. Tools included an exercise manual and fitness criteria. Analysis showed significant improvement in physical fitness post-exercise program, with students' performance levels significantly higher at the .05 level.

Nimsuwan, N. (2018) studied the physical fitness and exercise behaviors of students enrolled in swimming courses at Prince of Songkla University, Hat Yai Campus. The objectives were to assess students' fitness levels, knowledge, attitudes, and exercise behaviors, and their relationship with personal factors. The study involved 94 students from the 1/2018 semester. Tools included physical fitness tests and surveys on knowledge, attitudes, and behaviors. Results showed that 60.6% had low physical performance, knowledge levels were very good, attitudes were high, and exercise behaviors were moderate. No significant differences were found based on sex or year. Strategies to encourage consistent exercise were recommended.

Chet Niphat Pinkaew (2020) studied the effects of bodyweight resistance exercise programs using a fitness board on high school student physical fitness. The objectives were to compare pre- and post-experiment fitness levels in the experimental group and to compare post-experiment fitness levels between the experimental and control groups. The study involved 36 grade 4-6 students, split into matching groups of 18 each. Tools included a bodyweight resistance exercise program and standardized fitness tests. Results showed significant improvements in muscle strength and cardiovascular endurance at the .05 level in the experimental group, but no changes in body composition (BMI). Post-experiment, the experimental group had significantly better strength than the control group, with no differences in BMI or cardiovascular endurance.

Yodsing, C. (2020) conducted a study on developing health education and physical activities to improve physical fitness among grade 4 students. Objectives included creating effective learning activities for health and physical education at Prathom 4 and comparing academic achievements before and after implementing these activities. The research involved 34 students from Ubon Ratchathani Primary Educational Service Area Office 1 and Ubon Ratchathani Rajabhat University Demonstration School, selected randomly. Results

indicated the learning activities met effectiveness criteria (84.78/83.33), with significant academic improvement post-implementation at the .05 level. Student satisfaction with the activities was high (3.92/5.00).

Phunchai, W. (2022) studied the effects of Muay Thai on the physical fitness of elementary students. The objectives were to assess the impact of Muay Thai and compare fitness outcomes between experimental and control groups after 4 and 8 weeks. The study involved 60 students from Charoen Ratthapatham School, randomly divided into 30 in each group. Muay Thai exercises were given to the experimental group, while the control group did regular exercises. Results showed significant improvements in the experimental group's BMI, arm and upper body strength, abdominal strength, and cardiovascular endurance over 8 weeks. Comparatively, the experimental group had significantly better physical fitness than the control group at the .05 level.

Vega (2015) examined the impact of physical education programs on high school students' health-related fitness. The study involved 111 students aged 12-14, divided into 54 in the experimental group and 57 in the control group. The experimental group underwent a nine-week training program, followed by an eight-week maintenance program, each conducted twice a week. The study measured cardiovascular endurance, muscle performance, and physical perception at the start and end of the programs. Results indicated significant improvements in physical performance ($p < 0.01$), maintained post-program, but no significant changes in physical perception ($p > 0.05$). This suggests the program's effectiveness in enhancing and sustaining fitness.

Rachel, M. et al. (2018) studied the impact of a game-based intervention on cardiovascular endurance in children of diverse backgrounds, including those with skin color and Spanish cultural heritage. Over six weeks, 126 children aged 10-15 participated in 30-minute sessions using Nintendo Wii. Performance tests included a 60-second sit-up and a 3-minute step test. Results showed that the experimental group had significantly higher performance in both tests at the .05 level. Additionally, the group demonstrated significant improvements in exercise self-efficacy and social support for exercising.

Research Methodology

The research methodology consists of population and sample, variables studied, instruments used in the research, data collection, and data analysis and statistics used in the research as shown in the details below respectively.

1) The population used in this research was male and female students studying in grades 5 and 6 in primary schools in Chom Bueng District, Ratchaburi Province in the academic year 2023. 2) The sample included 60 grade 5 and 6 students from Chom Bueng District, Ratchaburi Province, in 2023. Participation was voluntary. Parents were informed and invited to enroll their children in the study, where research procedures and duration were explained. Students were divided into an experimental group of 30 students whose parents could facilitate regular attendance for 15 weeks of swimming activities, and a control group of 30 students whose parents agreed to bring them for scheduled physical fitness tests.

The independent variable is the swimming activity.

The dependent variable is the physical fitness of primary school students, consisting of Body Composition, Flexibility, Muscle Strength and Endurance, and Cardiovascular Endurance.

The researcher analyzed the results using a computer program. 1) Percentage, basic data of the sample group. 2) Calculate the mean and standard deviation of muscle strength and muscle endurance, cardiovascular endurance, flexibility, and body composition values before and after the 15th week of training in the experimental and control groups. 3) Test the difference in the mean physical fitness before and after the 15th week of training for all variables using the dependent t-test (paired t-test), and to test the difference in the mean physical fitness between the experimental and control groups, the independent t-test. 4) Test for statistical significance at the .05 level. 5) Present the results of data analysis in a table format with an essay.

Results

The results of enhancing physical fitness with swimming activities for primary school students found that the sample group consisted of 60 people, with 30 people in the control group, 16 males or 53.33 percent and 14 females or 46.67 percent, and 30 people in the experimental group, 16 males or 53.33 percent and 14 females or 46.67 percent. In terms of age, most of the experimental group were 11 years old, with 16 people or 53.30 percent, while most of the control group were 12 years old, with 14 people or 46.70 percent.

The physical fitness of primary school students in the experimental group before training swimming was assessed. The results indicated the average physical fitness levels across all aspects were moderate. Specifically, the overall body mass index was proportionate, flexibility was low, and the strength and endurance of the arm, upper body, and abdominal muscles were moderate. The endurance of the heart and circulatory system was at an outstanding level.

The physical fitness of the elementary school students in control group before training swimming found that the results of the physical fitness test of the elementary school students in the control group before training swimming showed that the average results in all aspects were at a moderate level. When considering each aspect, it was also found that the overall body mass index (BMI) was proportionate, the flexibility aspect was at a low level, the strength and endurance of the arm and upper body muscles were at a low level, the strength and endurance of the abdominal muscles were at a moderate level, and the endurance of the heart and circulatory system was at an excellent level.

The physical fitness of the elementary school students in the experimental group after training swimming found the results of the physical fitness test of the elementary school students in the experimental group after training swimming showed that the average results in all aspects were at a good level. When considering each aspect, it was also found that the overall BMI was proportionate, the flexibility aspect was at a moderate level, the strength and endurance of the arm and upper body muscles were at a good level, the strength

and endurance of the abdominal muscles were at a good level, and the endurance of the heart and circulatory system was at an excellent level.

The physical fitness of the elementary school students in the control group After training swimming, it was found that the results of the physical fitness test of the primary school students in the control group after training swimming showed that the overall average results in all aspects were at a moderate level. When considering each aspect, it was also found that the overall body mass index was proportionate. Flexibility was at a low level. The aspects of strength and endurance of the arm and upper body muscles were at a low level. Strength and endurance of the abdominal muscles were at a moderate level. Endurance of the heart and circulatory system was at an excellent level.

The hypothesis testing results, evaluating whether elementary school students who underwent training swimming showed improved physical fitness compared to before training, utilized a dependent t-test (paired t-test). Analysis of the experimental group's physical fitness before and after 15 weeks of training swimming revealed significant improvements across various variables. Before training, body composition (body mass index) was proportionate, and flexibility (sitting forward) was at a low level. Post-training, flexibility improved to a moderate level. Strength and endurance of the arm and upper body muscles (30-second push-ups) started at a moderate level and improved to a good level after training. Similarly, strength and endurance of the abdominal muscles (60-second sit-ups) increased from a low to a moderate level post-training. Endurance of the cardiovascular system (3-minute knee-lifting) remained very good both before and after training swimming. These findings indicate that swimming activities effectively enhanced the physical fitness of elementary school students in the experimental group. Swimming training significantly improved the physical fitness of elementary students. Body composition (BMI) increased proportionally, while flexibility, upper body strength, abdominal strength, and cardiopulmonary endurance showed significant improvements ($p < .05$). Initially low levels of flexibility, abdominal strength, and upper body strength increased to moderate or good levels post-training. Cardiopulmonary endurance remained excellent but was further enhanced.

The results of the research hypothesis testing "Primary school students in the experimental and control groups have different physical fitness after training swimming" For the comparison of the results of enhancing physical fitness with swimming activities of primary school students between the experimental and control groups after training swimming, the difference in the mean physical fitness between the experimental and control groups was tested using the independent t-test. It was found that the mean and standard deviation of physical fitness in terms of body composition (body mass index), flexibility (sitting forward), strength and endurance of the arm and upper body muscles (30-second applied push-ups), strength and endurance of the abdominal muscles (sitting up and down for 60 seconds), and endurance of the cardiovascular system (3-minute knee-lifting) of students in the experimental and control groups after training swimming were as follows: Swimming training yielded varied results between experimental and control groups. Body composition remained similar in both. However, the experimental group significantly outperformed the control in flexibility and cardiovascular endurance ($p < .05$). While both groups improved abdominal strength, the difference was not significant. Notably, the experimental group achieved a good level of upper body strength, unlike the control group.

Discussions

The results of enhancing physical fitness with swimming activities for primary school students found that the physical fitness of the experimental group of primary school students after training in swimming found that the overall average results in all aspects were at a good level. When considering each element, it was also found that the overall body mass index was proportionate, the flexibility was at a moderate level, the strength and endurance of the arm and upper body muscles were at a good level, the strength and endurance of the abdominal muscles were at a good level, and the endurance of the heart and circulatory system was at an excellent level. When comparing the physical fitness of primary school students before and after training swimming, after training swimming, primary school students had higher physical fitness than before training with statistical significance at a level of .05 in all aspects because the benefits of swimming can help blood circulation, heart, and lung function more efficiently, and muscle and nervous system function better

(Jaithon, B., 2005). Swimming is a sport that uses every body part to move in the water, causing the body to develop all parts simultaneously (Klinkesorn, S., 2016). This is consistent with (Yookong, B., 2016) who studied and found that Students had higher physical fitness development after using the scout stick exercise manual than before using the scout stick exercise manual at a statistical significance level of .05. The results of the physical fitness test after training were higher than before training because the exercise manual is a quality tool that has been examined by the experts. Students have knowledge and understanding of the training steps, which is consistent with Sunthorn, T. (2018) who found that physical fitness before and after the experiment, abdominal muscle strength and endurance, leg muscle strength, muscle flexibility, and body composition (subcutaneous fat) were developed and significantly different from each other. This is because the sample group exercised regularly, gradually increased the intensity of the activities, and did it continuously. Exercising by this principle will help build strength, endurance, muscle flexibility, and respiratory and circulatory system endurance. And also make the body composition at the appropriate level that is consistent with (Pinkaew, J.,2020) who found that the average value of physical fitness in terms of muscle strength and cardiovascular endurance of the experimental group before and after the experiment was significantly different at a statistical level of .05. It is consistent with (Supino, P., 2020) who found that the results of the physical fitness test before and after using the program were significantly different at a statistical level of .01. This is because exercise activities combined with basic movement skills and rhythm continuously for a long enough period to cause beneficial changes to the body, such as the effect on enhancing the endurance of the lungs, heart and circulatory system. Allowing the body to receive sufficient oxygen Including the program created by the researcher Allows students to develop mechanical abilities. Body movement consists of flexibility, strength, muscle endurance, and cardiovascular endurance It is consistent with (Poonchai, W., 2022) who found the effects of Muay Thai exercise on physical fitness in all 5 areas of the experimental group Before training After training Body mass index flexibility, strength and endurance of the arm and upper muscles strength and endurance of the abdominal muscles And endurance of the cardiovascular system There is a statistically significant difference at the .05 level. This is because Muay Thai exercise is an exercise that allows students' bodies to develop their physical fitness in terms of strength, flexibility, muscle endurance,

as well as organs related to the circulatory and respiratory systems to work efficiently, resulting in students' physical fitness developing more.

The results of the comparison of physical fitness enhancement with swimming activities of primary school students between the experimental and control groups after training swimming found that the experimental and control groups had physical fitness in terms of body composition (body mass index) and abdominal muscle strength and endurance with an average value that was not significantly different at the .05 level because the control group may have exercised or played sports or other activities that affect weight control and build abdominal muscle strength and endurance. It is consistent with (Pinkaew, J., 2020) who found that the average value of physical fitness in terms of body composition (body mass index) after the experiment of the experimental and the control groups was not different. This is consistent with (Patikham, K., 2021) who found that the experimental group had better physical fitness than the control group with a statistical significance level of .05, except for the test items, the average value of body mass index was not different because during the training, there may be an increase in muscle mass in both forms and the training did not control nutrition, causing the BMI to be different. This is consistent with (Poonchai, W., 2022) who found that the results of the effects of Muay Thai exercise on physical fitness in terms of BMI and the experimental and control groups after training were not different. The experimental group students had a mean physical fitness in terms of flexibility, strength, and endurance of the muscles of the arms and upper extremities, and endurance of the cardiovascular system that was significantly higher than the control group students at a statistical level of .05 because training swimming can help improve blood circulation, heart, and lung function, and improve muscle and nervous system function (Jaithon, B., 2005). This is consistent with (Pinkaew, J., 2020) who found that the mean physical fitness in terms of muscle strength after the experiment of the experimental group and the control group was significantly different at a statistical level of .05. This is consistent with (Patikham, K., 2021) who found that the experimental group had better physical fitness than the control group that was trained normally at a statistical level of .05, which is in line with the research hypothesis because they practiced the program for 8 weeks and were continuously supervised, resulting in better physical fitness in the experimental group. This is consistent with (Poonchai, W., 2022) who found the results of the effects of Muay Thai exercise on physical fitness in all 5

aspects of the experimental group and the control group after training were significantly different at the .05 statistical level.

New Knowledges

The knowledge that arises from this research is specifically beneficial to primary school students in Ratchaburi Province. The knowledge that arises from a combination of theory and practice, is using theory to create a plan for physical development through exercise activities, namely swimming, but not relying solely on swimming. Pre-swimming exercise is used to benefit the highly developed body, it results in a group-specific activity plan that can be adapted to other interested groups as appropriate. Furthermore, it reflects cultural preference that consists of values and norms, language and communication, and educational practice. In addition to improving their bodies, the swimming exercises assist kids in developing their interaction of cultural preferences with teachers and parents, particularly in the structure of educational practice itself.

Conclusions

The research found that swimming activities significantly enhance the physical fitness of primary school students. After training, the experimental group showed improvements in all fitness aspects, with body mass index proportionate, flexibility at a moderate level, and strength and endurance of both upper body and abdominal muscles at a good level. Cardiovascular endurance was excellent. Statistically significant improvements ($p < .05$) were noted in all fitness aspects compared to pre-training. This aligns with Jaithon (2005) and Klinkesorn (2016), highlighting the comprehensive benefits of swimming on the body. Similar results were found by Yookong (2016), Sunthorn (2018), and Pinkaew (2020), indicating improved physical fitness through structured exercise programs. The control group also showed some improvements, possibly due to other physical activities, but the experimental group had higher gains in flexibility, muscle strength, and cardiovascular endurance. These findings support the effectiveness of swimming in enhancing physical fitness, corroborating previous studies by Patikham (2021) and Poonchai (2022). Overall, swimming is a beneficial activity for improving various aspects of physical fitness in primary school students.

Suggestions

1. It may be necessary to improve swimming activities at secondary school levels, which will focus on training different swimming strokes, which will affect physical fitness in terms of body composition and strength and endurance of the abdominal muscles.

2. The results should be used by educational institutions to create physical fitness programs for their students.

Recommendations for future research

1. There should be a comparative test of physical fitness enhancement with swimming activities of elementary school students with other types of sports.

2. Physical fitness enhancement with swimming activities should be applied to preschool or early primary school children.

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