Using Local Sports Exercises to Enhance Physical Abilities in Older People

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Abstract

This research aims to study the effectiveness of physical exercise activities for local sports in the physical fitness of older people. The target group was 47 older adults from Taphong Subdistrict Elderly School in Rayong Province. The research instrument consists of 1) a video demonstration of local sports exercise postures and 2) a Senior Fitness Test (SFT). Data were collected from SFT in three periods: 1) before the activity, 2) during the activity in the 4th week, and 3) after the activity was completed in the 8th week. We analyzed the data using repeated measures analysis and the Bonferroni technique. The research found that older adults have better physical fitness during and after exercise, with a statistical significance of .05.

Keywords: Health Promotion Innovation, Physical Exercise, Folk Sports Wisdom, Elderly, Eastern Economic Corridor.

Exercise is not just a method used to enhance the physical capabilities of older people; it's a crucial aspect of their overall health and quality of life. It strengthens muscles, relieves stress, and stimulates respiratory and circulatory system functions, increasing efficiency and overall physical health. The Institute of Geriatric Medicine (2004) explains that older people must know and know about exercise, including the exercises, principles of exercise, steps involved, benefits, and the disadvantages of inactivity. Appropriate and consistent exercise is crucial in medical therapy to improve health and enhance physical, mental, and emotional quality of life. It reduces the risk of premature death, improves balance, helps relieve stress, and positively affects older adults. Promoting physical activity helps improve the quality of life for older people, as their physical condition allows them to engage in various activities. The physical capacity that affects these activities includes cardiovascular endurance, which is the ability of the heart and blood vessels to help older people feel strong enough to resist fatigue from exercise. Cardiovascular exercise involves large muscle groups and includes continuous walking, water aerobics, and line dancing (Jan, 2004). Therefore, designing exercise routines must consider stimulating various body parts, including different muscle systems and heart functions (Institute of Geriatric Medicine, 2004). This research is a significant contribution to our understanding of the role of physical activity in the health and well-being of older adults, and it has direct implications for healthcare professionals and organizations interested in promoting physical activity for this demographic.

Traditional Thai games or sports, known as indigenous sports, have existed since ancient times, although their origins still need to be determined. Historical assumptions are based on inscriptions, such as those from King Ramkhamhaeng's stele, and evidence in literary works and mural paintings. Throughout the years, people have continuously passed down and adapted these traditions to fit various eras, intertwining them with traditional Thai customs and culture. They enhance enjoyment and entertainment alongside daily work and during festive religious ceremonies throughout the seasons. Indigenous sports focus on enjoyment rather than competition, playing a significant role in molding behaviors and connecting players' social experiences. Players gain a sense of accomplishment and pride, see their value, and learn to be bold in their actions and expressions. They also learn to adjust and live happily with others, gaining skills in waiting, helping, sharing, and leadership, promoting mental health and social behaviors. The development of these activities prepares individuals for higher learning and effective growth (Department of Physical Education, 2014). According to international research reviews, Indigenous sports foster social maturity and pride among individuals. They also highlight the importance and value of one's own local culture, raising the profile of indigenous sports to a global level. Some countries, including Poland, have implemented national policies to promote indigenous sports tangibly. These policies include financial support for sports infrastructure development, training methods, coaching, and clear community sports development plans (Rif'iy Qomarrullah, Kurdi, and Lestari Wulandari, 2023). In the modern era, efforts to preserve the cultural heritage of indigenous sports include creating databases in China, establishing platforms for indigenous sports data, integrating data resources, and managing Big Data. These are logical strategies for perpetuating and developing indigenous sports in the significant data era, as sports scholars believe these sports need to survive and develop. Therefore, conservation methods must blend with time to integrate traditional and modern scientific practices (Jayachandra Indah, Mei Lv, and Wajid Ali, 2019). However, leveraging indigenous sports wisdom to promote health is a way to conserve these traditions, ensuring their continuation and creating value for players in terms of both physical and mental health.

We derive exercise regimens from traditional Eastern Special Development Zone sports by adapting local sports movements into suitable exercise forms for older people. This focuses on exercises that integrate the development of various body systems, including brain and neurological system management (Brain Gym), respiratory training (Breathing Exercises), and muscle stretching (Stretching Exercises). This research assessed the physical fitness of older adults across six dimensions: 1) leg muscle strength, 2) arm and upper body muscle strength, 3) cardiovascular and respiratory endurance, 4) flexibility of back and leg muscles, 5) flexibility of upper body and arms, and 6) agility and balance during movement.

Objectives

1. Research Purpose

This research aims to study the effectiveness of traditional sports exercise activities on the physical fitness of older people.

2. Research Framework

This research project involves using the wisdom of traditional sports from older people in the Eastern Economic Corridor (EEC) to design suitable traditional sports exercise activities for older people. These activities should serve as a standard regimen for older people to manage their physical health in daily life. Older people carry out these activities collectively before each teaching session in senior centers. The researcher evaluates the effectiveness of these traditional sports exercise activities by testing the physical fitness of the participants. We can summarize the conceptual framework:

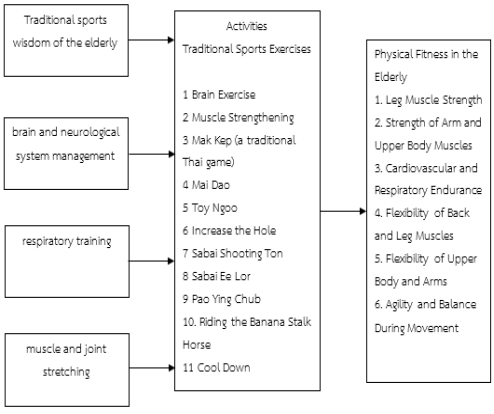

Image 1: Research Framework

Research method

This study is quasi-experimental research focused on intervention activities, specifically traditional sports exercise, anticipated to affect the physical fitness changes in older people. We select participants for the experiment based on their voluntary participation (non-randomized) rather than probability. In this experiment, the researcher cannot control external factors. We measure the outcomes in three stages: before the experiment, during the experiment, and after the experiment, using a time series experimental design. The research model is:

Image 2 Research Model

Pretest	Intervention	Posttest 1	Intervention	Posttest 2
O1	X	O2	X	O3
1. Physical Fitness Test 2. Measure Life Satisfaction	Traditional Sports Exercise Activities	Physical Fitness Test	Traditional Sports Exercise Activities	1. Physical Fitness Test 2. Measure Life Satisfaction

1. Target Area for Research

The researcher selected a continuously operating senior school in the Eastern Economic Corridor (EEC), specifically the Tambon Tapong, Rayong Province senior school.

2. Sample Group Used in the Research

The sample group consisted of elderly members from the Tambon Tapong, Rayong Province senior school, who willingly engaged in traditional sports exercises. The total number of participants is 47.

To determine the Sample Size, we used the G*Power version 3.1 software for the iOS operating system to calculate the sample size. The parameters set for the testing include:

Test family = F test, Statistical test = ANOVA: Repeated measures, within factors, Effect size f = 0.25, □ err prob = 0.05, Power (1-□ err prob) = 0.95, Number of groups = 1, Number of measurements = 3

The minimum sample size calculated was 43 individuals. We considered potential dropouts and increased the sample size by 10%, resulting in a final sample size of 47 participants for the research.

3. Research Tools Used

The tools used in this research comprise three principal components.

1) Demonstration Video of Traditional Sports Exercises: Videos showing the correct techniques and procedures for traditional sports exercises specifically designed for older people.

2) Conducting a physical fitness assessment for older adults based on the guidelines of Rikli and Jones (Rikli & Jones, 1999; 2002). In this research, the physical fitness of older people is assessed using the Senior Fitness Test (SFT) or Functional Fitness Test (FFT), developed by Rikli and Jones (1999; 2002). These tests have been designed to evaluate the functional physical fitness of older people as part of a program aimed at fostering lifelong well-being, enabling independence, and enhancing the quality of life. The assessment encompasses six aspects: Lower Body Strength,

Upper Body Strength, Aerobic endurance, Upper body Flexibility, Lower Body Flexibility, Agility/Dynamic Balance.

4. Data Collection

This research involves studying the effectiveness of traditional sports exercise activities. We conduct data collection in three stages, as detailed below.

1. Before the Traditional Sports Exercise Activities

Before the activities begin, older adult participants undergo six physical fitness tests conducted by sports and exercise experts from the Sports Authority of Thailand. Subsequently, experts select participants who score average or above on these fitness tests, totaling 47 individuals. However, if fewer than 47 participants meet the criteria, experts will consider those whose physical fitness levels are closest to normal to complete the group. Following selection, the researchers explain the objectives and benefits of the research project to older people, ensuring they understand and provide written informed consent. Participants in the research project may join or decline participation and withdraw from the activity at any time. Once older adult participants consent to join the research project, the researchers conduct the physical fitness tests, marking this as the pre-activity testing phase.

2) During the Traditional Sports Exercise Activities

In the research project, demonstration videos aim to boost elderly participants' engagement in traditional sports exercise activities. The research project conducts these sessions every Friday morning from 08:30 to 09:00, before older adult participants' regular weekly classes, over eight weeks. On other days, participants perform the exercises at home at their convenience. In the fourth week, older adult participants undergo a second physical fitness test for the mid-activity assessment.

3) At the End of the Traditional Sports Exercise Activity Plan

After completing the eight weeks of traditional sports exercise activities, older adult participants undertake a third physical fitness test. The results from this phase represent the post-activity assessment. After verifying the data integrity, the researchers further analyze the research findings. We summarize the research process in the following diagram.

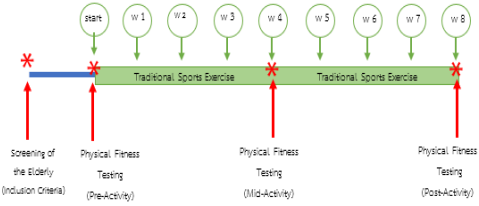

Image 3: Data Collection Steps for Studying the Effectiveness of Traditional Sports Exercise Activities

5. Data Analysis

The researcher will collect and verify the data for accuracy and completeness before proceeding with statistical analysis. The statistical methods used in the study include:

1. Mean and Standard Deviation: These describe the data related to the physical fitness test results and life satisfaction of older people.

2. Researchers use ANOVA with Repeated Measures to test the differences in the physical fitness test results of older people at various stages: before the commencement of the traditional sports exercise activities, during the activities at week 4, and at the end of the activities in week 8. In case of significant differences, we will perform pair-wise comparisons using the Bonferroni method to assess the change in confidence interval.

Research Results

The researcher presents the findings of the research:

Effectiveness of Traditional Sports Exercise Activities on the Physical Fitness of Older Adults

Among the 47 elderly individuals participating in traditional sports exercise activities, 13 were male, and 34 were female. The participants' ages ranged from 60 to 84, with the majority being women (72.3%) and an average age of 70.17.

- The participants underwent physical fitness testing across six dimensions: leg muscle strength, upper body and arm muscle strength, cardiovascular and respiratory endurance, back and leg muscle flexibility, upper body and arm flexibility, and agility and balance during movement. We conducted these tests three times: Test 1 before the activities began, Test 2 during the activities in week 4, and Test 3 after the activities in week 8. Table 1 displays the average scores of the six dimensions, assessed over the three testing periods, against the established benchmarks.

Table 1: Mean and Standard Deviation of Physical Fitness Test Results in the Elderly (N=47)

Physical Fitness	Testing Method	Passing Criterion	Pre-Activity		During Activity		Post-Activity	
			M	S.D.	M	S.D.	M	S.D.
Leg Muscle Strength	30-second Chair Stand	≥ 8 times	14.49	4.101	17.72	4.307	21.87	6.002
Upper Body and Arm Muscle Strength	30-second Arm Curl	≥ 11 times	23.66	4.856	29.66	6.664	34.11	6.518
Cardiovascular and Respiratory Endurance	2-minute Step Test	≥ 65 times	78.43	16.349	95.40	19.345	103.72	16.907
Back and Leg Muscle Flexibility	Sit and Reach	≤ 4 inches	1.04	2.528	0.52	1.507	0.43	1.251
Upper Body and Arm Flexibility	Back Scratch Test	≤ 4 inches	2.69	3.675	1.52	2.744	1.11	2.053
Agility and Dynamic Balance	Timed Up and Go (2 meters)	≤ 9 seconds	8.04	1.373	7.03	1.271	6.20	1.225

Table 1 Improvements in the Physical Fitness of the Elderly Across All Six Areas

1. In all three testing phases, older participants showed leg muscle strength by completing over eight chair stands in 30 seconds. In the post-activity phase, participants showed the highest performance, averaging 21.87.

2. Upper Body and Arm Muscle Strength: Participants could flex their elbows over 11 times within 30 seconds during all testing phases. The post-activity phase yielded the highest performance (M = 34.11).

3. In all stages, older participants exhibited impressive cardiovascular and respiratory endurance, achieving over 65 leg lifts in just two minutes. Notably, the post-activity phase yielded the highest scores, averaging 103.72 leg lifts.

4. Back and Leg Muscle Flexibility: Participants could reach their toes while sitting, with a gap of less than 4 inches between their fingertips and toes. This was best performed in the post-activity phase (M = 0.43, S.D. = 1.251), then during the activity (M = 0.52, S.D. = 1.507), and before the activity (M = 1.04, S.D. = 2.528).

5. Participation in the activity led to a notable increase in upper body and arm flexibility for seniors, with a mean difference of less than 4 inches (M = 1.11, S.D. = 2.053).

6. Agility and Balance: Participants could stand up, walk around a cone, and sit down in less than 9 seconds, performing best in the post-activity phase (M = 6.20, S.D. = 1.225), followed by during the activity (M = 7.03, S.D. = 1.271), and before the activity (M = 8.04, S.D. = 1.373).

As detailed above, the results from these physical fitness tests across all six areas show significant improvements. The researchers used ANOVA with repeated measures to show the variance in performance before the activities began, during week 4 of the activities, and after the activities ended, as shown in Table 2.

Table 2: Analysis of Variance in Physical Fitness Tests Among the Elderly Before, During (Week 4), and After (Week 8) the Exercise Program (N = 47)

Measure	Comparison	*S.S.*	*df*	*M.S.*	*F*	*Sig.*	η^2
Leg Muscle Strength	Between subjects	2694.553	46	58.577			
	Interval	1287.504	1.669	771.444	100.411*	.000	.686
	Error	589.830	76.772	7.683			
Upper Body and Arm Muscle Strength	Between subjects	3587.830	46	77.996			
	Interval	2583.589	2	1291.794	79.562*	.000	.634
	Error	1493.745	92	16.236			
Cardiovascular and Respiratory Endurance	Between subjects	27584.539	46	599.664			
	Interval	15626.993	2	7813.496	47.682*	.000	.509
	Error	15075.674	92	163.866			
Back and Leg Muscle Flexibility	Between subjects	398.415	46	8.661			
	Interval	10.365	1.189	8.715	6.625*	.009	.126
	Error	71.968	54.713	1.315			
Upper Body and Arm Flexibility	Between subjects	998.500	46	21.707			
	Interval	62.750	1.329	47.228	17.713*	.000	.278
	Error	162.957	61.118	2.666			
Agility and Balance	Between subjects	165.045	46	3.588			
	Interval	79.883	2	39.942	56.485*	.000	.551
	Error	65.055	92	.707			

* Significant at the .05 level

Pairwise Comparison of Physical Fitness Test Results in older adults by Specific Aspects (N = 47) Leg Muscle Strength: Sum of Squares (S.S.) for the variance between different stages (before, during, after the activities): 1287.504 Mean Square (M.S.): 771.444 F Distribution (F): 100.411, showing a significant difference with a Significance (Sig.) value of .000 Effect Size: 0.686, showing significant differences in leg muscle strength across the three stages at the .05 level.

Upper Body and Arm Muscle Strength: S.S.: 2583.589 MS: 1291.794 F: 79.562, with a Sig. of .000 Effect Size: 0.634, showing significant differences in strength at the .05 level across all measured time points.

Cardiovascular and Respiratory Endurance: S.S.: 15626.993 MS: 7813.496 F: 47.682, with a Sig. of .000 Effect Size: 0.509, showing significant endurance differences between the measurement stages at the .05 level.

Back and Leg Muscle Flexibility: S.S.: 10.365 MS: 8.715 F: 6.625, with a Sig. of .009 Effect Size: 0.126, showing significant differences in flexibility at the .05 level, though with a lower effect size compared to other measures.

Upper Body and Arm Flexibility: S.S.: 62.750 MS: 47.228 F: 17.713, with a Sig. of .000 Effect Size: 0.278, showing significant differences in flexibility at the .05 level.

Agility and Balance When Moving: S.S.: 79.883 MS: 39.942 F: 56.485, with a Sig. of .000 Effect Size: 0.551, showing significant differences in agility and balance at the .05 level.

To account for these significant variances in physical fitness test results across the stages before, during, and after the traditional sports exercise activities, we conducted pair-wise comparisons for each dimension using the Bonferroni method, as detailed in Table 3. These comparisons affirm that the activities significantly improved physical fitness among older people.

Table 3: Pairwise Comparison of Physical Fitness Test Results in the Elderly by Dimension (N = 47)

Measure	*Comparison*	*M.D.*	*S.E.*	*Sig.*
Leg Muscle Strength	During Activity - Before Activity	3.234*	0.392	.000

	After Activity - Before Activity	7.383*	0.558	.000
	After Activity - During Activity	4.149*	0.594	.000
Upper Body and Arm Muscle Strength	During Activity - Before Activity	6.000*	0.866	.000
	After Activity - Before Activity	10.447*	0.874	.000
	After Activity - During Activity	4.447*	0.748	.000
Cardiovascular and Respiratory Endurance	During Activity - Before Activity	16.979*	2.185	.000
	After Activity - Before Activity	25.298*	2.872	.000
	After Activity - During Activity	8.319*	2.810	.005
Back and Leg Muscle Flexibility	During Activity - Before Activity	-0.521*	0.200	.012
	After Activity - Before Activity	-0.617*	0.230	.010
	After Activity - During Activity	-0.096	0.083	.253
Upper Body and Arm Flexibility	During Activity - Before Activity	-1.166*	0.277	.000
	After Activity - Before Activity	-1.574*	0.348	.000
	After Activity - During Activity	-0.409*	0.169	.019
Agility and Balance	During Activity - Before Activity	-1.006*	0.171	.000
	After Activity - Before Activity	-1.841*	0.179	.000
	After Activity - During Activity	-0.835*	0.170	.000

* Significant at the .05 level

From Table 3, statistically significant results across almost all comparisons underscore the effectiveness of traditional sports exercise activities in enhancing various aspects of physical fitness among older people. The only exception was comparing back and leg muscle flexibility after activity vs. during activity, which was not statistically significant. The physical fitness test results of older people have significantly improved across all measured dimensions:

Leg Muscle Strength: During the activities (Week 4), it was better than before the activities began, with a significant difference at the .05 level. It was better after the activities (Week 8) than before the activities started, with a substantial difference at the .05 level.

Upper Body and Arm Muscle Strength: During the activities, it was better than before, with a significant difference at the .05 level. After the activities, it was better than before, with a significant difference at the .05 level.

Cardiovascular and Respiratory Endurance: During the activities, it was better than before, with a significant difference at the .05 level. After the activities, it was better than before, with a significant difference at the .05 level.

Back and Leg Muscle Flexibility: During the activities, it was better than before the activities began, with a significant difference at the .05 level after the activities were better than before the activities started, with a substantial difference at the .05 level.

Post-activity and during-activity phases did not show significant differences.

Agility and Balance: During the activities, agility was better than before, with a significant difference at the .05 level.

Research Summary

Traditional sports exercise activities led to a noticeable statistical enhancement in all six physical fitness dimensions among elderly participants. Researchers noted this improvement during and after the activity compared to the participants' baseline measurements.

Discussion of Research Results

The researcher discusses the results according to the objectives of the research.

Effectiveness of Traditional Sports Exercise Activities on the Physical Fitness of Older Adults Research findings show a clear improvement in the physical fitness of older people in all aspects both during the activity (week 4) and upon completion (week 8). The physical fitness test results exceeded the standard benchmarks and pre-activity scores (Table 3). This improvement is because of traditional sports activities that involve physical exercises, warm-up routines, targeted muscle workouts, breathing exercises, and relaxation activities. We enhance these sessions with conventional community

music to make the exercises enjoyable and engaging. The senior schools have scheduled these activities before classes every week, and older adult participants also have the flexibility to perform these activities at home at their convenience. This regular engagement has led to improved physical test results, as noted by Achra Purakhom and colleagues (2018), stating that "effective physical activity programs for older adults usually include warm-up and cool-down phases, focusing on enhancing physical, mental, and cognitive performance, which are crucial for improving the quality of everyday life for older adults."

The findings align with the study conducted by Siraphop Ta Ping (2021) in a senior club in Yu Wa, San Pa Tong District, Chiang Mai. The experimental group showed significant statistical improvements in physical function after an 8-week program, compared to a control group at the .05 level. Research confirms that promoting physical activity programs can enhance the physical fitness of older people, as found by Alessandra de Carvalho Bastone (2004), where the exercise program improved lower leg function and knee strength and enabled older people to walk faster. Carvalho et al. (2012) also studied the effects of an exercise program in an older women's group. They found that the exercise program improved the participants' physical fitness, particularly muscle flexibility, and enhanced their response to physical and social stimuli.

Recommendations

The researcher offers the following suggestions based on the objectives and findings of the research:

1 Promotion of Traditional Sports Exercise Activities: Traditional sports exercise activities, which include specifically tailored physical movements suitable for older people within the community context, have shown significant benefits in enhancing the physical fitness of older people. These activities are enjoyable and effectively engage older people. Thus, we suggest continuously promoting such activities among older people and extending them to neighboring communities.

2. Adaptation for Different Communities: The developed activities in this research incorporate eight traditional sports movements. Communities with different traditional sports can adapt these movements to include local traditional sports in their exercise routines, ensuring the activities align with their cultural heritage.

3. Local and Cultural Agencies' Role: Agencies promoting local wisdom, such as Sub-district Administrative Organizations and Provincial Cultural Offices, should prioritize reviving and adapting local sports cultures. The agencies promoting local wisdom, such as Sub-district Administrative Organizations and Provincial Cultural Offices, should prioritize integrating these into community activities that can be applied daily and expanded to the youth and the public.

4. We should incorporate traditional sports exercises into community-based learning centers for lifelong learning. This will help sustain a vibrant and enduring cultural heritage.

5. Promotion by Local Authorities: Since traditional sports are part of local play and culture, local authorities should promote awareness of these sports within communities. They should encourage physical activity through various formats of traditional sports, making them a regular part of community life.

Recommendations for Future Research

1. Development of Additional Traditional Sports Exercises: Future research should explore and develop additional exercises that adapt other known traditional sports movements within the community to promote widespread and tangible engagement.

2. Longitudinal Study: Research should be ongoing to monitor the long-term effects of these activities on physical fitness and their impact on other health aspects, such as cardiovascular function and metabolic conditions like blood sugar and cholesterol levels.

3. Effectiveness of Individual Exercise Movements: Further studies should compare the effectiveness of individual traditional sports exercise movements. This would contribute to the academic knowledge base and validate the effectiveness of these exercises through scientific principles.

4. Study on Additional Variables: Research should also examine the effectiveness of traditional sports exercises on other variables, such as cognitive decline, working memory, and depressive states, to understand their broader health benefits.

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