



The Thai Folk Game “Jik Sen” has Become a Recreational Sport for Older People in Senior Citizen Schools

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Abstract

Objectives. The purposes of this study were to: 1) develop an exercise program incorporating the Thai recreational sport “Jik Sen” for older people in senior citizen schools; 2) investigate the effects of the exercise program incorporating the Thai recreational sport “Jik Sen” on the physical fitness of older people in senior citizen schools; and 3) assess the satisfaction level of older people with the exercise program incorporating the Thai recreational sport “Jik Sen”.

Materials and methods. This was a two-group experimental study including the experimental group of 17 people (65.53 ± 3.43 years) and the control group of 17 people (65.76 ± 3.60 years). The participants in this study were healthy individuals aged 60 years and above, who were actively engaged in the elderly school program. They were selected using a purposive sampling method and subsequently assigned them to the experimental and control groups using a matching method based on BMI. The research tools consisted of the exercise program, which incorporated the Thai recreational sport “Jik Sen” developed by the research team, and the Senior Fitness Test (SFT). For a period of 8 weeks, the experimental group involved in an exercise regimen comprising 60 minutes of daily training in the Thai recreational sport “Jik Sen”, with a frequency of 3 days per week. The control group was instructed to maintain their normal daily routine and did not participate in any physical activities or exercise programs during the experiment. The data were analyzed using mean, standard deviation, percentage, and t-test.

Results. 1) The exercise program incorporating the Thai recreational sport “Jik Sen” for older people in senior citizen schools can be appropriately used to promote exercise and sports in elderly schools in Thailand. The IOC value was 0.97. 2) A significant difference was observed in the mean scores of the 8-foot up-and-go test between the pre-experimental (mean = 7.94, SD = 1.34) and post-experimental (after 8 weeks) (mean = 6.70, SD = 0.79) periods for the experimental group at the level of 0.05. The mean scores of the 8-foot up-and-go test between the control group (mean = 7.84, SD = 1.16) and the experimental group (mean = 6.70, SD = 0.79) were also found to be significantly different at the level of 0.05. 3) The experimental group expressed high levels of satisfaction with the exercise program involving the Thai recreational sport “Jik Sen” for older people in senior citizen schools, with a mean score of 4.62 ± 0.51 points.

Conclusions. The exercise program incorporating the Thai recreational sport “Jik Sen” can effectively enhance the dynamic balance of older individuals in senior citizen schools. Furthermore, it has been shown to facilitate social interaction, improve cognitive abilities including thinking and planning skills, and promote enjoyment.

Keywords: elderly schools, older people, physical fitness, recreational sport, Thai folk game.

Introduction

Over the past 20 years, the number of older people in Thailand has steadily increased as in many countries around

the world (Department of Economic and Social Affairs, 2023), and it is still an increasing trend at the present (Department of Older Persons, 2023a; Teerawichitchainan et al., 2020; Thaithatkul et al., 2022). In addition to the issue of the continuously increasing number of older people, it has also been found that Thai older people tend to live longer (Department of Older Persons, 2023a). Although living a longer life of Thai older people is a good thing,

not all Thai older people have good health and are able to rely on themselves and cope with the rising costs of living in today's society, especially the cost of medical care. As a result, this population group often has health problems caused by deterioration of the body, finally, leading illnesses and disabilities. Consequently, the demand for long-term care is increasing (Ladavanich & Chalongsamdee, 2016). The problems of shortage of caregivers for older people and abandonment of older people must be concerned and urgently solved by Thai government agencies in order to prevent the problems which may happen in the near future.

Thailand has taken proactive steps and approaches to address the problems caused by the continued rise in the number of Thai older people (Department of Elderly Affairs, 2023), including the establishment of elderly schools under the concept that “Older people have value and potential that should be encouraged and supported to participate in making contributions to society and lifelong learning should be promoted for older people” (Department of Older Persons, 2017). This is to encourage older people to have self-care skills, earn income, and be able to live their lives on their own by relying on other people as little as possible (Charoenwisal & Dhammasaccakarn, 2022; Kulachada & Mitchell, 2019; Ratana-Ubol, 2021). A survey in 2023 revealed that there were 2,390 elderly schools across all regions of Thailand, and the number of elderly students increased to 169,901 people (Department of Older Persons, 2023b). The activities in the elderly school curriculum mainly include providing knowledge about self-care, developing appropriate career skills and promoting various types of recreational activities in order to enhance and develop the quality of life of older people (Aroonsrimorakot et al., 2022; Department of Older Persons, 2017).

Recreational activities offer numerous benefits for the elderly, contributing to their physical, mental, and social well-being. Engaging in leisure activities has been associated with improved physical health outcomes such as enhanced mobility, balance, and cardiovascular health (Cohen-Mansfield et al., 2019). Furthermore, participation in recreational pursuits promotes social interaction, reducing the risk of social isolation and loneliness commonly experienced by older adults (Wang et al., 2016). In the context of elderly schools in Thailand, exercise and sports are considered important and necessary recreational activities. All schools often use such activities to promote physical fitness and health of older people. However, from the review of previous research, it was found that the exercise and sports activities of older people in elderly schools are still quite limited and there are relatively few studies. Examples of popular activities include aerobic dance, ballroom dancing, Petanque, Woodball, etc. (Kaewsuphan et al., 2023). There are also limitations on the locations of elderly schools in Thailand. The meeting room of the Sub-district Administrative Organization and the temple's sermon hall are used as the locations for some elderly schools. Also, school buildings may be built as classrooms of elderly schools. However, most classrooms are single-story buildings, which are not very large. Therefore, if sports that can be played indoors are developed for older people, it does not take up much of the playing space and is safe for older people. It should also help motivate and stimulate adequate physical activity among older people in elderly schools in Thailand.

Folk play, a traditional form of cultural expression, holds educational, social, and entertainment values that are passed

down through generations (Asante & Sam, 2022; Choi & Park, 2022). These play games are integral to preserving intangible cultural heritage and promoting community cohesion (Ramani, 2022; Thu, 2022). However, the modernization of aesthetics and the advent of digital entertainment pose challenges to the sustainability of folk plays, leading to a decline in their popularity and transmission to younger generations. Thai folk games are considered recreational activities that create fun for the participants and spectators that help promote exercise and social skills (Hnawinchot et al., 2019; Sangiamvibool & Chommanee, 2020; Tangsirirup & Butsatorn, 2020; Thonglong & Bussamongkhon, 2022). They have been continuously played and passed down from generation to generation since ancient times. The sports developed from Thai folk games that are well known internationally include Takraw, Thai boxing, and Krabi-Krabong, etc. (Komaratat et al., 1984).

“Jik Sen” is a gambling folk game that is very popular in the northeastern region of Thailand (Tongterm, 2013). The rules, regulations, and methods of playing are similar to those of Petanque. That is, when playing Petanque, players must throw the petanque ball as close to the Petanque target ball as possible in order to win the game. As for Jik Sen, players must try to throw their playing equipment as close to the mid-field line as possible. The player who can throw closest to the mid-field line is the winner of the game. In the past, many types of equipment were used for this game, such as elastic bands, rubber puppets, baht coins, and soda caps with flat edges. These are items that children can find easily, and are inexpensively, or leftover materials from their own households. A previous study revealed that the research team developed “Jik Sen” a recreational sport for youth, and it was found that “Jik Sen” could create fun for both players and spectators and help develop the physical fitness of youth with high safety (Tongterm et al., 2023).

Based on the aforementioned important information in terms of the increasing number of Thai elderly people, the sports and recreational activities suitable for older people in elderly schools that are still quite limited and the situation of Thai folk games that have received less attention in today's society, the research team was interested in 1) developing the exercise program with the Thai recreational sport “Jik Sen” for older people in elderly schools, 2) investigating the effects of the exercise program with the Thai recreational sport “Jik Sen” on the physical fitness of older people in elderly schools and 3) assessing the satisfaction of older people with the exercise program with the Thai recreational sport “Jik Sen” developed by the research team. In addition to obtaining an alternative form of exercise for older people in elderly schools, the research team also expects that the results of this research will help promote the conservation of Thai folk games so that they do not disappear from Thailand and encourage the new generation of Thai youth to become interested in Thai folk games.

Materials and Methods

Study Design

This was two-group experimental research: the control group (CG) and the experimental group (EG). The experimental plan is presented below.

CG (n=20) M O₁ X₁ O₂EG (n=20) M O₃ O₄

M – refers to the selection of samples to the experimental group and the control group using the matching method based on BMI.

X₁ – refers to the participation in the exercise program with the Thai recreational sport “Jik Sen” developed by the research team.

O₁, O₃ – refers to the physical fitness test before the experiment.

O₂, O₄ – refers to the physical fitness test after the 8th week of the experiment.

Study Participants

The population included 127 older people at Duan Yai Rom Pho Thong School for the Elderly in 2022 (Duan Yai Administrative Organization, 2022).

The sample size was calculated using the G*Power program version 3.1.9.7 (Faul et al., 2009) based on the physical fitness test results of body flexibility before and after the experiment of a previous study by Petchalalai & Udompanich (2019). The effect size was 1.47. The significance level was set at 0.05 and the power of the test was 95% ($1-\beta=0.95$). As a result, the appropriate sample size was 11 people per group. However, to prevent the drop-out during data collection, 80% of the calculated sample size was added in each group (9 people per group). Therefore, the total sample size was 40 people: 20 people in the experimental group and 20 people in the control group. The inclusion criteria and the exclusion criteria were as follows.

Inclusion criteria:

- 1) Students studying at Duan Yai Rom Pho Thong School for the Elderly in 2022 aged 60 years and over.
- 2) Not having medical indication prohibiting exercise.
- 3) Not taking medicines or dietary supplements that affect physical fitness.
- 4) Willing to participate in the research.

Exclusion criteria:

- 1) Exercising/playing sports regularly, starting from 3 days/week (30 minutes per day) and continuously for at least 3 months before participating in the research.
- 2) Having participated in a trial exercise program in the 3 months before participating in the research.

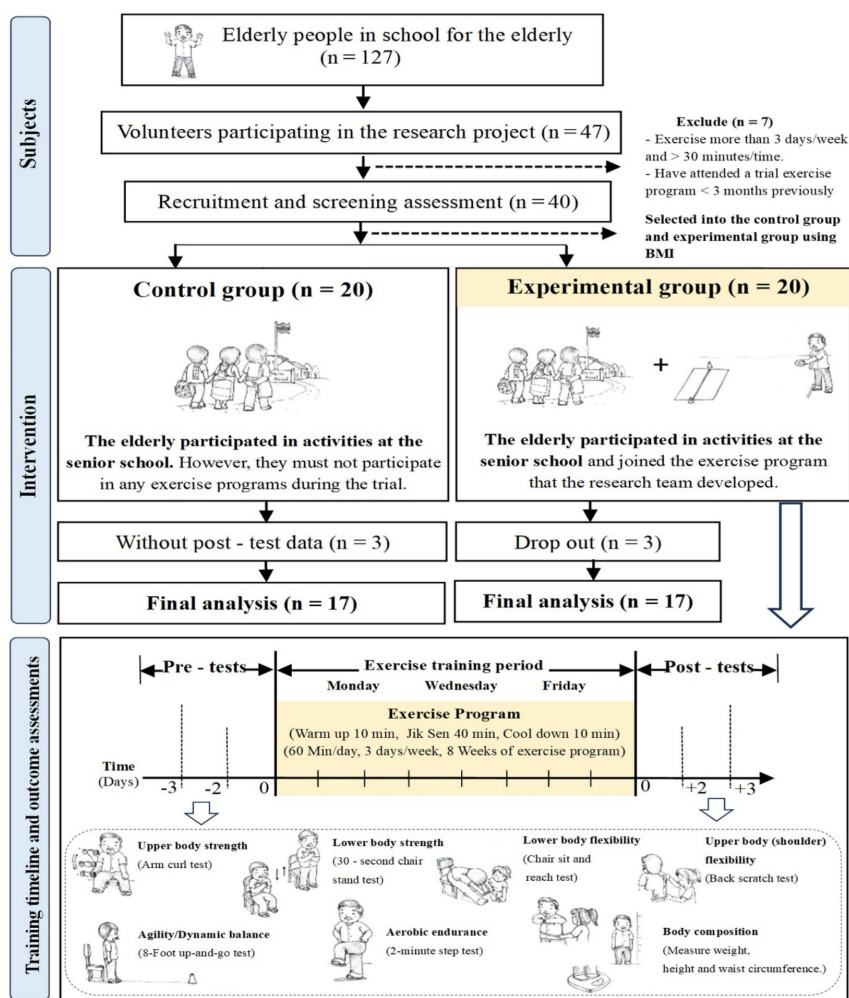


Fig. 1. Outline of training and testing schedule

3) Having heart disease complications or diseases related to the respiratory system.

4) Having accidents, complications, and bone and joint diseases while participating in the research.

5) Unable to participate in the research until it is completed or wishing to leave the research.

Forty elderly volunteers participating in this research were randomly assigned into 2 groups: the experimental group of 20 people and the control group of 20 people based on BMI using a simple random sampling method (Table 1).

During the research process, 3 participants in the experimental group dropped out of the experiment, and 3 participants in the control group could not be followed up to collect post-test data. Therefore, this study used a total of 34 samples for data analysis: the experimental group of 17 people and the control group of 17 people, as shown in Fig. 1.

Table 1. Method of dividing the participants into the experimental group and the control group based on BMI (n = 40)

Female (n = 32)		Male (n = 8)	
Group 1 (n = 16) Experimental group	Group 2 (n = 16) Control group	Group 1 (n = 4) Experimental group	Group 2 (n = 4) Control group
(The highest) The 1 st	The 2 nd	(The highest) The 1 st	The 2 nd
The 4 th	The 3 rd	The 4 th	The 3 rd
The ...	The ...	The 5 th	The 6 th
(The lowest) the 32 nd	The 31 st	(The lowest) the 8 th	The 7 th

Research Tools

1) The exercise program with the Thai recreational sport “Jik Sen” for older people in elderly schools: It was developed from the recreational sport “Jik Sen” for youth proposed by Tongterm et al. (2023). This exercise program consisted of 3 steps: a 10-minute warm-up step, a 40-minute Jik Sen playing step and a 10-minutes cool down step (Table 2). The face validity was evaluated by 5 experts in sports science and physical education. It was found that the exercise program could be appropriately and safely used for older people in elderly schools. Moreover, the content validity was evaluated using the index of item objective congruence (IOC), and the IOC was 0.97. The experimental group did exercise training for a period of 8 weeks, 3 days per week (Monday, Wednesday, and Friday), 60 minutes a day. Every day of the experiment, the participants in the experimental group were divided into 4 teams. The experiments were conducted during the same time period, 4:00-5:00 p.m., while the control group was instructed to carry out their normal daily routine. They must

not participate in any other physical activity experiments during this research study.

2) Senior Fitness Test (SFT) (Rikli & Jones, 1999a; 1999b): It was employed to assess 7 aspects of physical fitness including: 1) lower body strength assessed by 30 – second chair stand, 2) upper body strength assessed by arm curl test, 3) cardiorespiratory endurance assessed by 2-minute step test, 4) upper body flexibility assessed by back scratch test, 5) lower body flexibility assessed by chair sit-and-reach test, 6) agility/dynamic balance assessed by the 8-foot up-and-go test and 7) body composition assessed by Body Mass Index (BMI) and waist circumference (Fig. 1).

3) The satisfaction assessment form for the exercise program with the Thai recreational sport “Jik Sen”: The responses are on the 5-point Likert scale (Shonkoff et al., 2016) as follows: (a) 5 = the highest level of satisfaction; (b) 4 = a high level of satisfaction; (c) 3 = a moderate level of satisfaction; (d) 2 = a low level of satisfaction; and (e) 1 = the lowest level of satisfaction.

Table 2. The exercise program with the Thai recreational sport “Jik Sen”

No	Practice	Method of action
Warm Up (10 minutes)		
The warm-up period of the experimental group consisted of 6 poses in the following order:		
1		– Sit on a chair with a straight back and stretch the arms out in a palm-down position. – Clench and unclench the fingers slowly, repeating 10 times. – Turn the hands over and clench and unclench the fingers slowly, repeating 10 times. – Stretch the arms out in a palm-down position and flick the wrists continuously for 30 seconds.
Fig. 2. Pose 1: Fingers Clenched		
2		– Sit on a chair with a straight back (slightly in front of the chair). – Stretch the right knee forward as far as possible and hold for 5 seconds and slowly return to the starting position. – Repeat the same posture, 10 times on each side. – Lift the right leg alternating with the left leg continuously as fast as possible for 30 seconds.
Fig. 3. Pose 2: Knee Stretching		
3		– Stand up straight behind a chair and use the hands to hold onto the edge of the chair (to prevent falling). – Slowly lower down by bending the knees into a squat position according to the individual's ability and hold in the squat position for 5 seconds. – Return to the starting position. – Repeat the same posture 10 times.
Fig. 4. Pose 3: Squat		

Table 2 (continued)

No	Practice	Method of action
4		– Stand up straight behind a chair and use the hands to hold the edge of the chair. – Raise both toes slowly and hold for 5 seconds. – Return to the starting position. – Repeat the same posture 10 times.
Fig. 5. Pose 4: Standing on Tiptoes		
5		– Stand upright on the side of a chair with one hand on the chair. – Slowly swing the leg back and forth, keeping the knee straight as far as possible. – Contract the buttock and leg muscles and hold for about 5 seconds. – Slowly pull the leg back, and slowly swing the leg forward as far as possible. – Contract the leg and hold for about 5 seconds, then return to the starting position. – Repeat the same posture by alternating right-left leg, 5 times on each side. – Swing you're the leg alternating back and forth as quickly as possible (height depends on the ability of each volunteer). – Alternate the right-left leg for 30 seconds on each side.
Fig. 6. Pose 5: Leg Swings		
6		– Stand up straight with one hand on a chair. – Raise the right knee forward and try to bring the knee as close to the chest as possible, hold for 5 seconds and return to starting position. – Alternate the right-left leg, 5 times on each side. – Stomp on the feet (in place) and raise the knee up for 30 seconds.
Fig. 7. Pose 6: Standing with Legs Raised		

Table 2 (continued)

No	Practice	Method of action
Exercise Time (40 minutes)		
	  Fig. 8. The experimental group participating in the exercise program with Thai recreational sport "Jik Sen"	The recreational sport "Jik Sen" was developed from Thai folk game, called "Jik Sen" that is popularly played in the northeastern region of Thailand. The rules, regulations, and playing methods can be briefly described as follows: (1) Players: "Jik Sen" is a team sport, consisting of 5 players/team. (2) Play area: The field is made of rubber tiles with 2 meters wide, 2 meters long, and 1.5 millimeters thick. The mid-field line is 5 centimeters wide (red) with 2 short cones (Figure 9(b)). (3) Materials: Rubber rings with a round shape, 16 centimeters in diameter, 3 centimeters of thickness and 200 grams/ring (Figure 9(a)). Fifteen rubber rings will be given to each team/game. That is, 3 rubber rings will be given to each player/game. One player can throw 3 rubber rings per game. Each player cannot throw for the other. The players from both teams will receive different colored rubber rings, for example Team A will get red rubber rings and Team B will get blue rubber rings. (4) Competition format: Two teams per round will be competed. In this research, a mixed team playing style was used. (5) Duration: The duration of play is not limited. Whichever team can accumulate 100 points first is the winner. (6) Scoring: Scores will be counted one game at a time. In each game, a total of 30 rings will be used (both teams' rubber rings). That is, when all 30 rings are played, it is called 1 game, and the referee will count the scores for one round. When the game is finished, the play area for scoring will be divided into 2 sides: the north of the play area and the south of the play area. One rubber ring in the field boundary will be counted as 1 point. The scoring methods are as follows. (6.1) Scoring is made separately based on the 2 play areas, namely the north of the play area and the south of the play area (Figure 9(b)). (6.2) Scoring is made for each play area at a time (the north/the south of the play area). Whichever team's rubber rings are closest to the mid-field line is the winner on that side and will receive points equal to all the rubber rings within the boundary of that side's field (all rings that fall within the boundary of that side's field are counted). If a rubber ring is found close to the edge of the field with any point of the rubber ring overlapping the field line, it is considered that the rubber ring is still on the field and scored. As for the rubber ring that has no point touching the field, it will be counted as a negative score. That is, scoring on both the north and the south of the play area must be done first. After that, the scores for the rubber rings outside the field area will be subtracted. One rubber ring outside the boundary of the field is -1 point. So, in some games, the team may get negative scores because there are no scores from the play area and the points are deducted from throwing the rubber ring outside the play area. This is at the discretion of the referees, and the referees' decision shall be considered final. (7) Lose – win: Whichever team can accumulate 100 points first is the winner. But in the case of the last game that both teams get more than 100 points, the team with the highest score is the winner. The competition will continue until there is the winning team. (8) Breaks between games: "Jik Sen" is a continuously playing game. However, players can sit and rest or stand when it is not their playing order. The order of play depends on the planning of each team. (9) Substitution of players: Players on each team can only make substitutions at the end of each game, not during the game, and each team has the right to make an unlimited number of substitutions. (10) Foul: There is one type of foul, which is the player steps on the line while throwing the rubber ring (the point at which the throw is determined). If one team's players commit 5 fouls, the other team will receive an additional 1 point, and the action will be taken every time such fouls occur. (11) Referees: There are 3 referees, consisting of 1 referee, 1 lineman, and 1 assistant scorer. (12) Playing methods: The methods of playing the recreational sport "Jik Sen" are similar to those of Petanque. To play Petanque, players must try to throw the ball as close to the target ball (jack) as possible. The team that can throw the ball closer to the target ball will win each round of the game. But for "Jik Sen", players must try to throw the rubber ring as close to the mid-field line as possible (red line). Players can throw their rubber rings to cause the rubber rings of either their own team or those of the opponent on the field to bounce off (Figure 8). Those interested in the recreational sport "Jik Sen" for the elderly can see an example of how to play it at https://www.youtube.com/watch?v=uQzBeRPVvOQ&t=99s.
	 (a)  (b) Fig. 9. (a) Materials for playing "Jik Sen", (b) The boundary of the play area for scoring	

Cool Down (10 minutes)

During the cool down, the participants in the experimental group performed a total of 6 poses, including Pose 1: Standing with Legs Raised; Pose 2: Leg Swings; Pose 3: Standing on Tiptoes; Pose 4: Squat; Pose 5: Knee Stretching; and Pose 6: Fingers Clenched. That is, they performed the same poses as during the warm-up period but with the change of the sequence of poses, starting from Pose 6 to Pose 1.

Human Research Ethics

This study received approval from the Research Ethics Review Committee of Sisaket Rajabhat University on December 1, 2022 (HE651013). Each volunteer provided informed consent.

Statistical Analysis

The participants characteristics were analyzed by mean, standard deviation, and percentage. The physical fitness data for all variables were tested for normal distribution before the experiment using the Shapiro-Wilk Test. The mean physical fitness test results between before and after the experiment were compared within the group using paired t-test. The means between the groups before the experiment and after the 8th week of the experiment were compared using independent t-test. The statistical significance was tested at the 0.05 level. The satisfaction assessment results of the experimental group with the exercise program (i.e., the recreational sport “Jik Sen”) were analyzed based on the following scores: 5 points = extremely satisfied, 4 points = very satisfied, 3 points = moderately satisfied, 2 points = slightly satisfied, and 1 point = not at all satisfied. The results of satisfaction levels on each aspect and overall satisfaction were summarized using mean and standard deviation (SD). The 5 levels of assessment criteria were defined with the following score ranges (Rezwan et al., 2022). A mean score of 1.00 to 1.50 indicates the lowest level of satisfaction. A mean score of 1.51 to 2.50 indicates a low level of satisfaction. A mean score of 2.51 to 3.50 indicates a moderate level of satisfaction. A mean score of 3.51 to 4.50 indicates a high level of satisfaction. A mean score of 4.51 to 5.00 indicates the highest level of satisfaction.

Results

This study involved 34 older people at Duan Yai Rom Pho Thong School for the Elderly, divided into 17 in the control group (4 males and 13 females, with an average age of 65.53 ± 3.43 years) and 17 in the experimental group (4 males and 13 females, with an average age of 65.76 ± 3.60 years).

The general information of the participants is presented in Table 3. Before the experiment, no significant differences were found in the mean scores of all physical fitness tests at the level of 0.05 in both the experimental group and the control group (Table 4).

Table 4. Mean scores in physical fitness in all 2 groups after 8-week training

Parameters	CG (n = 17)				EG (n = 17)			
	Pre-test	Post-test	t	P-value	Pre-test	Post-test	t	P-value
BMI (kg/m ²)	22.78 ± 2.28	23.14 ± 2.47	-2.45	0.03*	22.88 ± 1.85	22.80 ± 1.97	0.60	0.56
WC (inches)	32.15 ± 3.71	32.35 ± 3.94	-0.37	0.71	31.91 ± 4.07	31.82 ± 3.48	0.16	0.87
Chair stand (no. of stands)	15.82 ± 2.19	15.12 ± 2.15	1.62	0.12	15.24 ± 2.86	16.00 ± 2.78	-1.23	0.24
Arm curl (no. of reps)	18.29 ± 3.37	18.12 ± 2.34	0.26	0.80	18.06 ± 4.12	18.94 ± 2.70	-1.16	0.26
2-Min step (no. of steps)	83.59 ± 18.39	84.12 ± 17.95	-0.17	0.86	83.65 ± 19.87	86.94 ± 20.85	-1.55	0.14
Back scratch (inches +/-)	-2.79 ± 3.70	-2.82 ± 2.84	0.06	0.95	-2.76 ± 3.29	-2.44 ± 3.22	-0.47	0.64
Chair sit and reach (inches +/-)	3.24 ± 3.87	3.65 ± 3.84	-0.51	0.62	3.88 ± 4.09	5.18 ± 3.56	-2.09	0.05
8-Foot up-and-go (seconds)	8.09 ± 1.13	7.84 ± 1.16	1.03	0.32	7.94 ± 1.34	6.70 ± 0.79	5.20	0.01*†

Description: *Significant $p < 0.05$ (pre vs post), †Significant $p < 0.05$ (CG vs EG)

Table 3. Baseline characteristics of cardiovascular parameters in the CG and the EG (n=34)

Parameters	CG (n = 17)	EG (n = 17)
Age (y)	65.53 ± 3.43	65.76 ± 3.60
Weight (kg)	58.76 ± 5.77	59.06 ± 6.89
Height (cm)	160.71 ± 6.62	160.47 ± 6.30
BMI (kg/m ²)	22.78 ± 2.28	22.88 ± 1.85
Waist circumference (inches)	32.15 ± 3.71	31.91 ± 4.07
Resting heart rate (b/m)	78.24 ± 11.04	77.65 ± 9.01
SBP (mm/Hg)	137.00 ± 21.43	135.47 ± 13.15
DBP (mm/Hg)	79.12 ± 13.69	88.41 ± 19.27

Descriptions: CG: control group and EG: experimental group; BMI: body mass index; WC: Waist circumference; SBP: systolic blood pressure; DBP: diastolic blood pressure. Values are mean ± SD. No significant difference was found between the two groups for any variable

Table 4 shows the mean values of physical fitness before and after 8 weeks of training. It was found that the EG, the mean scores of the 8-foot up-and-go test between the pre-test and the post-test were significantly different at the level of 0.05. Also, after the 8th week of the experiment, the EG had better mean test results for the 8-foot up-and-go test than before the experiment (Table 4).

In particular, after 8 weeks of training, the comparison results of the physical fitness test between the CG and the EG revealed a significant difference in mean scores of the 8-foot up-and-go test at the level of 0.05 (Table 4 and Figure 10).

The EG expressed satisfaction with the exercise program incorporating the Thai recreational sport “Jik Sen” for older individuals in elderly schools, which was developed at the highest level by the research team (Table 5).

Discussion

The exercise program with the Thai recreational sport “Jik Sen” for older people in elderly schools was developed from the recreational sport “Jik Sen” for youth proposed by Tongterm et al. (2023). The results of the experiment showed that the appropriate playing distance for older people was a throwing distance of 4 meters. The exercise program consisted of 3 steps: a 10-minute warm-up step, a 40-minute Jik Sen playing step and a 10-minutes cool down step, 60 minutes in total (Table 2). The findings revealed that the exercise program with the Thai recreational sport “Jik Sen” can be

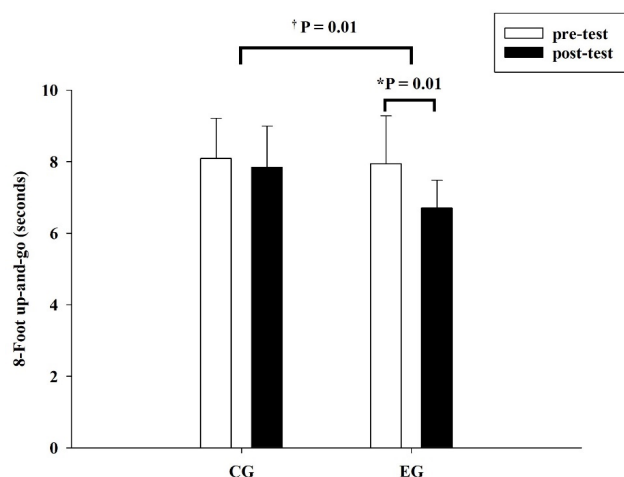


Fig. 10. Changes in 8-Foot up-and-go before and after 8-week of the training period. Values are present as mean $\pm$ SD. *Significant $p < 0.05$ (pre vs post), †Significant $p < 0.05$ (CG vs EG)

Table 5. The results of the assessment of the satisfaction of the older people in the EG on the exercise program with the Thai recreational sport “Jik Sen” for older people in elderly schools developed by the research team ($n = 17$)

Topics	Results	
	Mean $\pm$ SD	Satisfaction level
1. Equipment, field, rules and regulations.	4.52 $\pm$ 0.56	Highest
1.1. The equipment is appropriate.	4.53 $\pm$ 0.62	High
1.2. The field is appropriate.	4.53 $\pm$ 0.51	High
1.3. The rules are clear and appropriate.	4.41 $\pm$ 0.62	High
1.4. The criteria for wins and losses are clear and appropriate.	4.41 $\pm$ 0.62	High
1.5. The duration of the competition (per pair) is appropriate.	4.65 $\pm$ 0.49	Highest
1.6. The referees are adequate (3 people/field) and appropriate.	4.59 $\pm$ 0.51	Highest
2. Suitability for the elderly.	4.69 $\pm$ 0.53	Highest
2.1. The rules and regulations are easy to understand.	4.53 $\pm$ 0.72	Highest
2.2. It is safe to play.	4.71 $\pm$ 0.47	Highest
2.3. It is suitable for organizing competitions for the elderly.	4.82 $\pm$ 0.39	Highest
3. Value for the elderly.	4.65 $\pm$ 0.48	Highest
3.1. It is fun.	4.76 $\pm$ 0.44	Highest
3.2. It creates unity.	4.76 $\pm$ 0.44	Highest
3.3. It helps develop thinking and planning skills.	4.53 $\pm$ 0.51	Highest
3.4. It helps develop physical fitness.	4.53 $\pm$ 0.51	Highest
Overall	4.62 $\pm$ 0.51	Highest

appropriately used among older people in the elderly school. This may be because the recreational sport “Jik Sen” has light intensity that does not cause the older people to become fatigued from excessive playing. It was found that more than 90% of older people in the elderly school were able to participate in this activity very well. In addition, the recreational sport “Jik Sen” has rules, regulations, and methods of playing that are not complicated. Older people can easily understand how to play it. The playing materials (rubber rings) are also very safe. Older people can pick up and hold the rubber ring easily because it is circular in shape with a hole in the middle, similar to a donut. If the rubber ring falls out of the player’s hand or falls on the floor, it does not cause much danger or injury to the player’s body because it is relatively lightweight (200 grams) and very flexible. In addition, this exercise program was developed with the main objective of being used as an indoor recreational activity in order to avoid the extremely hot weather of Thailand. However, it can be played both indoors and outdoors with the same standards because the equipment and the competition field can be moved. As for the price of playing materials, rubber rings are cheap and can be easily purchased online. The last point that is considered a highlight of this exercise program is that it was developed from the Thai folk game “Jik Sen” which was very popular in the past. Therefore, older people feel familiar with it because they know and had experience playing it in the past.

Changes in test results of the 8-foot up-and-go test after the 8th week of the experiment was reflected that the agility and dynamic balance of the older people improved due to participation in the exercise program with the Thai recreational sport “Jik Sen”. Participating in this exercise program allows older people to move their bodies by getting up from and sitting on their chairs, walking to start playing the game (throwing rubber rings), walking to the play area to plan the game and analyze the results of each game. Walking back and sitting in their own chairs (throwing distance of 4 meters), squatting and swinging the arms to send force to the rubber ring while throwing, stretching the body while throwing the rubber ring to shorten the throwing distance cause the leg muscles to be used in continuous movement, resulting in more efficient motor unit and muscle contraction. Repeated these movements will cause motor recruitment to be used to increase muscle contraction and the working frequency of that motor unit, resulting in muscle contraction and strength (Adliah & Rini, 2023; Martini et al., 2022; Vittala & Setiawan, 2023). When older people have better muscle strength in the lower body, it can result in better balance while moving (Hemachithra & Booshaa, 2022). Many previous studies found that practicing a variety of different types of walking can help promote balance (Malasari et al., 2022; Rusminingsih, 2021; Shier et al., 2016) and reduce the risk of falls among the elderly (Rusminingsih et al., 2021). In addition, the warm up and cool down postures, including Squat, Standing on Tiptoes, Leg Swings and Standing with Legs Raised also help improve balance among older people. The findings also revealed that the physical fitness of the older people who participated in the exercise program with the Thai recreational sport “Jik Sen” was improved after the experiment in almost every test item. It is because the exercise program with the Thai recreational sport “Jik Sen” allows older people to have continuous physical activity. For this reason, participating in this exercise program continuously and for a sufficient period of time may result

in improved overall physical fitness among older people. Although this study did not find any clear results of change, at least it can be primarily confirmed that participating in the exercise program with the Thai recreational sport "Jik Sen" developed by the research team can help maintain the physical fitness among older people in the elderly school.

The study results also showed that the older people in the experimental group were satisfied with the exercise program with the Thai recreational sport "Jik Sen" for older people in elderly schools developed by the research team at the highest level. Possibly, this developed exercise program is more of a sport than general exercise. That is, there are rules, regulations, and methods of playing, and judging for losing and winning. It is also safe and easy for older people to play. Moreover, both older men and women can play it together. These reasons may cause the older people in the elderly school to participate in the recreational activities. In addition, from the non-participant observation during the experiment, it was also found that during participation in the exercise program, most older people talked, smiled, laughed, gave encouragement, and built confidence to other players on their own team. Applause sounds are heard from time to time for their own and teammates' performance. They also participated in planning the playing strategies of their own team at all times to defeat the opposing team. The older people also said that they were proud of themselves when they won. During the game, they were also talking and exchanging opinions with each other, allowing them to have more interactions with others. As a result, they will not be lonely and the happiness level increase, affecting their long-term well-being. Moreover, another possible reason is that the recreational sport "Jik Sen" was developed from the Thai folk game in the past. Therefore, more than 80% of older person in the experimental group had experience playing this Thai folk game during their childhood. Therefore, the older people in the experimental group felt joyful as if they had gone back to the days of their childhood, leading to the feelings of love in the traditions and culture of the nation, which currently receives less attention. This is consistent with a study by Fidan (2023) which reported that patriotism had a positive effect on life satisfaction. The study also confirmed that people who can be considered patriots tended to have higher levels of life satisfaction. Therefore, if the recreational sport "Jik Sen" is promoted by relevant agencies to make it an alternative activity in elderly schools throughout Thailand, it may not only help preserve the Thai folk game to not disappear from the country, but also promote the successful operation of elderly schools as is the case in many countries (Artisa & Kirana, 2021; Ide et al., 2023; Wong et al., 2019).

Conclusions

It can be concluded that the exercise program with the Thai recreational sport "Jik Sen" for older people in elderly schools developed by the research team is suitable for use in the context of Thai elderly schools. That is, it is an exercise program that helps encourage older people in elderly schools to have more interactions with others. It also helps promote thinking and planning skills and enjoyment. In addition, it is highly safe. It can be played indoors. Regarding the development of physical fitness, it can help improve agility and dynamic balance among older people.

Recommendations

Recommendations for the Implications of the study:

1. Public health personnel can apply the exercise program with the Thai recreational sport "Jik Sen" developed by the research team, such as adjusting the format to be played in single or pairs or increasing/decreasing playing materials (rubber rings) for players or reducing the playing duration to be appropriate for the health of older people they are responsible for.
2. The use of the exercise program with the Thai recreational sport "Jik Sen" should be expanded to the elderly group who do not participate in elderly school activities, such as those living in nursing homes or under the care of private elderly care facilities.

Recommendations for further research:

1. This study was conducted only over an 8-week period. Therefore, a long-term study should be conducted because changes in some physical fitness variables may be found.
2. An experimental study on the effects of participating in the exercise program with the Thai recreational sport "Jik Sen" for older people on variables other than physical fitness, such as thinking and planning skills, happiness level and quality of life should be conducted.

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Conflict of interest

The author declares that no conflicts of interest.

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Тайська народна гра «Джік Сен» набула статусу рекреаційного виду спорту для осіб похилого віку в школах даної категорії населення

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів

Реферат. Стаття: 11 с., 5 табл., 10 рис., 44 джерела.

Мета дослідження. Мета цього дослідження була спрямована на реалізацію наступних завдань: 1) розробити програму вправ, що включає заняття з тайського рекреаційного виду спорту «Джік Сен» для осіб похилого віку в школах цієї категорії населення; 2) дослідити вплив програми вправ з тайського рекреаційного виду спорту «Джік Сен» на показники фізичної підготовленості літніх людей в школах даної категорії населення; 3) оцінити рівень задоволеності осіб похилого віку програмою вправ для занять з тайського рекреаційного виду спорту «Джік Сен».

Матеріали та методи. Проведено двогрупове експериментальне дослідження, що складалося з експериментальної групи в кількості 17 осіб (65,53 ± 3,43 років) та контрольної групи до якої було залучено також 17 осіб (65,76 ± 3,60 років). У дослідженні брали участь люди з добрим станом здоров'я віком від 60 років і старше, які активно займалися за програмою школи для літніх осіб. Для відбору учасників використовувався метод цілеспрямованої вибірки, після чого вони були розподілені на експериментальну та контрольну групи за допомогою методу зіставлення на основі індексу маси тіла. Інструменти дослідження охоплювали програму вправ, що включала тайський рекреаційний вид спорту «Джік Сен», розроблений дослідницькою групою, а також тест на визначення рівня фізичної активності для осіб похилого віку (SFT – Senior Fitness Test). Впродовж 8 тижнів експериментальна група виконувала програму вправ, що складалася з 60 хвилин щоденних тренувань з тайського рекреаційного виду спорту «Джік Сен», з частотою занять 3 дні на тиждень. Контрольний груп було доручено дотримуватися свого звичного розпорядку дня і не брати участі в жодних фізичних навантаженнях або програмах тренувань під час експерименту. Отримані дані проаналізовано із використанням середнього значення, стандартного відхилення, відсоткового співвідношення та t-критерію.

Результати. 1) Програма вправ, що включає тайський рекреаційний вид спорту «Джік Сен» для осіб похилого віку в школах даної категорії населення, може бути належним чином застосована з метою популяризації фізичних вправ і спорту в навчальних закладах для літніх людей в Таїланді. Значення ІОС становило 0,97. 2) Спостерігалася достовірні різниця в середніх балах у виконанні тесту на визначення швидкості, спритності та рівноваги (учасники мали встати зі стільця, пройти якомога швидше відстань 2,44 м – 8 футів і знову сісти) між передекспериментальним (середнє = 7,94; SD = 1,34) та післяекспериментальним (через 8 тижнів) періодами (середнє = 6,70; SD = 0,79) у досліджуваних осіб експе-

риментальної групи на рівні 0,05. Середні бали тесту при вставанні зі стільця та швидкості ходи на відстань 8 футів між контрольною групою (середнє = 7,84; SD = 1,16) та експериментальною групою (середнє = 6,70; SD = 0,79) також показали значну різницю на рівні 0,05. 3) Експериментальна група висловила високий рівень задоволеності програмою вправ з тайського рекреаційного спорту «Джік Сен» для осіб похилого віку в школах даної категорії населення із середньою оцінкою $4,62 \pm 0,51$ бала.

Висновок. Програма вправ, що включає заняття з тайського рекреаційного виду спорту «Джік Сен», сприяє ефективному покращенню динамічної рівноваги осіб похилого віку в школах для даної категорії населення. Крім того, було доведено, що така форма фізичної активності полегшує соціальну взаємодію, поліпшує когнітивні здібності, включаючи навички мислення і планування, а також сприяє отриманню задоволення від життя.

Ключові слова: школи для осіб похилого віку, літні люди, фізична підготовленість, рекреаційний вид спорту, тайська народна гра.

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