



A STUDY ON PHYSICAL TRAINING EXERCISES FOR STUDENTS WITH LOW PHYSICAL FITNESS AT THE HIGH SCHOOL OF EDUCATION PRACTICE, CAN THO UNIVERSITY, VIETNAM

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Abstract:

Physical education in schools is a compulsory subject within the national curriculum across all educational levels and plays a vital role in achieving the goal of holistic education. This study aims to select a set of physical training exercises designed to improve the fitness of students with limited physical capacity at the High School of Education Practice, Can Tho University, Vietnam. To address the aim, the research employed standard scientific methods commonly used in sports science, including document analysis, survey, pedagogical testing, experimental teaching, and statistical analysis. The research sample consisted of 38 tenth-grade students at the High School of Education Practice, Can Tho University, who were identified as having low physical fitness. The study identified 10 exercises, specifically one for speed development, two for strength development, three for endurance improvement, two for flexibility enhancement, and two for coordination skills. These exercises have been proven to contribute significantly to improving the overall physical fitness of students with lower fitness levels at the school.

Keywords: exercises, low physical fitness, student, School of Pedagogical Practice, Can Tho University, Vietnam

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1. Introduction

Physical education in schools plays a vital role within the broader national education and training system. It holds a significant position and meaning in achieving the overarching educational goal: *“to foster the comprehensive development of Vietnamese people with ethics, knowledge, culture, health, aesthetics, and professional skills; to build citizens with strong moral qualities, competencies, and civic consciousness; to nurture patriotism, national pride, and loyalty to the ideals of independence and socialism; to promote the potential and creativity of every individual; to enhance intellectual standards, develop human resources, and cultivate talents to meet the demands of national construction, defense, and international integration”* [1].

As a component of the sports sector, physical education is tasked with *“holistically developing physical qualities, thereby enhancing physical capacities, improving body composition, consolidating health, and systematically forming and perfecting essential life skills”* [2], [3], [4]. In the current era of educational reform, it is critical to reaffirm the importance of physical education to fully realize its role in comprehensive education. Building a prosperous and civilized nation requires not only intellectually capable and morally upright citizens but also physically strong individuals. Caring for the physical well-being of the population is the collective responsibility of all sectors, especially education, healthcare, and sports. This is particularly important for the younger generation, who deserve increased attention [5], [6].

On September 2, 2018, the Prime Minister approved the "Vietnam Health Program," which highlighted physical activity promotion among children, students, and university learners as a key measure. This included strengthening physical education programs and ensuring adequate facilities, space, and equipment for training and sports activities in educational institutions [7]. Later, on October 2, 2021, the Prime Minister approved the "School Health Program," outlining five major areas and seven strategic measures to enhance student health care [8].

More recently, Conclusion No. 70-KL/TW dated January 31, 2024, issued by the Politburo, emphasized the development of sports in the new era. It underlined the need for innovation in school physical education, linking it to educational goals that focus on holistic student development in terms of ethics, knowledge, culture, health, aesthetics, and life skills. This conclusion also called for greater investment in facilities, teaching staff, and research on age-appropriate physical and psychological development. It aims to expand physical education programs, create opportunities for student participation in physical activity, and identify and nurture young talent [9].

Throughout different historical periods of national reform, the Party has consistently prioritized public health. It has provided guiding principles for the advancement of physical education and sports, especially within schools, as a key factor in improving the stature and fitness of the Vietnamese people, contributing to national development and defense.

Can Tho University is one of Vietnam's top ten key national universities. The university currently comprises 14 faculties, 3 research institutes, one Center for National

Defense Education, and one Department of Physical Education. Can Tho University offers training in 85 undergraduate programs, 35 master's programs, and 14 doctoral programs, serving approximately 30,000 full-time students. Its core missions include education, scientific research, and technology transfer to support socio-economic development in the region [10].

At Can Tho University, the physical education curriculum has been officially implemented since 2015. The program consists of a range of elective sports courses, including athletics, taekwondo, volleyball, swimming, football, badminton, aerobics, basketball, and chess. Student feedback on the quality and satisfaction with these elective courses plays a crucial role in improving, ensuring, and enhancing the overall quality of training [11].

Physical fitness is a vital factor that significantly influences students' health, academic performance, and daily activities. For students with limited physical fitness, selecting and applying suitable exercises can help improve their health, enhance their physical condition, and provide a foundation for holistic development. Given the importance of this issue, the present study is conducted under the title: *A Study on Physical Training Exercises for Students with Low Physical Fitness at the High School of Education Practice, Can Tho University, Vietnam*.

2. Methodology

2.1 Research methods

The study employed the following research methods:

- **Document analysis and synthesis method** [12]: This method was used to gather and systematize relevant theoretical and practical knowledge in the field of physical education for high school students. The information collected from various documents served as a foundation for defining the research objectives, selecting appropriate methods, and designing physical fitness development exercises for the target population.
- **Survey method:** This method was applied to collect expert opinions from specialists, coaches, and physical education teachers. Their insights were used to inform the selection of appropriate physical fitness exercises for students with limited physical capacity.
- **Pedagogical testing method:** This method was used to assess the students' physical fitness based on standardized tests stipulated by the Ministry of Education and Training (Decision No. 53/2008/QĐ-BGDĐT) [13]. The tests included: handgrip strength (kg), sit-ups in 30 seconds (repetitions), standing long jump (cm), 30-meter sprint from a high start (seconds), shuttle run 4 × 10 meters (seconds), and 5-minute run for distance (m).
- **Pedagogical experimental method:** This method was conducted to verify the effectiveness of the selected physical fitness exercises. The study applied a self-comparison (within-subject) design. The experimental group consisted of 38 tenth-

grade students (16 male and 22 female) from the High School of Education Practice, Can Tho University, Vietnam. The experiment was conducted on-site at the school during the 2022-2023 academic year. The evaluation criteria were based on the physical fitness tests defined in Decision No. 53/2008/QĐ-BGDĐT.

- **Statistical analysis method:** This method was used to process and analyze the data collected throughout the study. Statistical analysis was performed using SPSS 22.0 software [14], [15], [16], [17].

2.2. Research participants

2.2.1 Experimental subjects

38 tenth-grade students from the High School of Education Practice - Can Tho University. The participating students were those who had not yet met the physical fitness standards set by the Ministry of Education and Training.

The group included 38 students: 16 male and 22 female.

2.2.2 Survey subjects

30 individuals (including experts, coaches, and physical education teachers) from provinces in the Mekong Delta region, selected through purposive sampling.

3. Results and Discussion

3.1 Selection of physical fitness development exercises for students with low fitness levels at the High School of Education Practice, Can Tho University, Vietnam

Using the methods of reference, analysis, and synthesis of documents by authors such as Nguyen Van Long (2020) [18], Nguyen Van Truong (2017) [19], and Le Thi Thanh Trang (2016) [20], as well as through practical observation during the teaching process. Based on the document synthesis, the school's current physical facilities, and the students' training levels, the study compiled a list of physical fitness development exercises to be included in the survey.

The study continued to conduct a survey to determine appropriate exercises for improving physical fitness among students. The survey subjects included 30 physical education teachers and lecturers from schools in the Mekong Delta region. The survey focused on evaluating the appropriateness of the exercises based on three levels:

- Level 1: Very suitable,
- Level 2: Suitable,
- Level 3: Unsuitable.

The study was expected to select exercises based on the survey results, and then design a training plan for each exercise to enhance the physical fitness of students with low fitness levels at the High School of Education Practice, Can Tho University.

A total of 30 questionnaires were distributed, and 30 were collected. All 30 responses were valid; there were no invalid responses. The results are presented in Table 1 below.

Table 1: Survey results on physical fitness development exercises for students at the High School of Education Practice, Can Tho University

No.	Exercises	Result (n = 30)					
		Very suitable	%	Suitable	%	Unsuitable	%
Speed Development Exercises							
1	Small-step running in place (reps/30s)	10	33,33	12	40	8	26,67
2	High-knee running (reps/30s)	11	36,67	9	30	10	33,33
3	Leg-flinging running (reps/30s)	13	43,33	10	33,34	7	23,33
4	Back-kick running for 20-30m (reps)	9	30	11	36,67	10	33,33
5	Standing start sprint (20-60m) (seconds)	28	93,33	2	6,67	-	-
6	Sand running (seconds)	5	16,67	10	33,33	15	50
Strength Development Exercises							
7	High box jump for 30 seconds, 3-5 sets, 2-minute rest between sets	10	33,33	11	36,67	9	30
8	Frog jumps forward for 20m, 2-3 sets, 2-minute rest between sets	29	96,67	1	3,33	-	-
9	Standing broad jump (cm)	9	30	11	36,67	10	33,33
10	Jumping jacks for 30 seconds - 1 minute (reps)	22	73,33	8	26,67	-	-
11	Single-leg hopping continuously for 10 - 15 times (reps)	4	13,33	12	40	14	46,67
12	Alternating leg hopping for 20m (reps)	14	46,67	5	16,67	11	36,66
13	Uphill or stair running (reps/seconds)	11	36,67	6	20	13	43,33
Endurance Exercises							
14	200m run, 2-minute rest, repeat at 70-80% effort (reps)	4	13,33	12	40	14	46,67
15	400m run x 2 sets, 5-minute rest between sets	9	30	12	40	9	30
16	Relay hopping for 15-20m (reps)	8	26,67	12	40	10	33,33
17	5-minute run at self-selected pace (meters)	12	40	7	23,33	11	36,67
18	Natural terrain running (reps)	23	76,66	5	16,67	2	6,67
19	Jump rope in place for 1-3 minutes (reps)	24	80	4	13,33	2	6,67
20	1000m walking	29	96,67	1	3,33	-	-
Flexibility Exercises							
21	Stretching exercises (seconds)	4	13,33	12	40	14	46,67
22	Hip stretches (seconds)	11	36,67	6	20	13	43,33
23	Shoulder press stretches (seconds)	14	46,67	5	16,66	11	36,67

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24	Seated knee press stretch (seconds)	12	40	7	23,33	11	36,67
25	Seated forward bend with both legs extended (reps)	14	46,67	14	46,67	2	6,66
26	Standing forward bend (seconds)	14	46,67	13	43,33	3	10
Coordination Exercises							
27	Combined drills: small-step running, high knees, heel kicks - change exercise on cue	26	86,67	4	13,33	-	-
28	Combined drill: high knees for 5-10m before back-kick running for 10m	11	36,67	6	20	13	43,33
29	High knees with sprint on command for 30m	22	73,34	7	23,33	1	3,33
30	Shuttle run 4 × 10m	4	13,33	12	40	14	46,67
31	9-3-6-3-9m run on the volleyball court	4	13,33	12	40	14	46,67
32	Sprint with quick direction change on signal	14	46,67	5	16,66	11	36,67
33	Zigzag running	14	46,67	5	16,67	11	36,66

Based on the survey results displayed in Table 1, the study identified 10 exercises that received an agreement rate of 80% or higher for suitability (see Table 2). These exercises, listed in Table 2, would then be incorporated into the physical development program designed for low-fitness students at the High School of Education Practice, Can Tho University.

Table 2: The selected physical development exercises for the students
with low physical fitness, High School of Education Practice - Can Tho University

No.	Exercises	Proportion	Aspect
1	High-start sprint for distances of 20-60m (seconds)	100%	Speed
2	Frog jumps forward for 20m, 2-3 times, rest 2 minutes between sets	100%	Strength
3	Split-leg jumps for 30 seconds to 1 minute (reps)	100%	Strength
4	Running on natural terrain (reps)	93,33%	Endurance
5	Rope jumping in place for 1-3 minutes (reps)	93,33%	Endurance
6	Walking 1000m	100%	Endurance
7	Seated forward bend with legs extended (reps)	93,34%	Flexibility
8	Standing forward bend (seconds)	90%	Flexibility
9	Combination of small-step running, high knees, and heel kicks; switch exercises upon hearing a signal	100%	Coordination
10	High knees with sprint on command for 30m	96,67%	Coordination

3.2. Implementation and evaluation of the effectiveness of physical fitness development exercises for students at the High School of Education Practice, Can Tho University

3.3.1 Experimental implementation

To determine the effectiveness of the selected exercises in improving the physical fitness of students with low fitness levels at the High School of Education Practice, Can Tho University, the study conducted a four-month experimental period to evaluate the effectiveness of the exercises selected in Section 3.1. The experiment was carried out at the High School of Education Practice, Can Tho University.

3.3.1.1 Experimental subjects

The experimental group consisted of 38 Grade 10 students from the High School of Education Practice, Can Tho University, during the 2021-2022 academic year, who had not yet met the requirements of the physical fitness assessment.

The group included 16 male students and 22 female students.

During the experimental period, the group followed the standard physical education curriculum issued by the Department of Education and Training while integrating the selected physical fitness development exercises.

3.3.2 Pre-experiment assessment

To evaluate the effectiveness of the physical fitness development exercises for students with low fitness levels at the High School of Education Practice, Can Tho University, the study conducted a pre-experimental assessment of students' physical fitness levels. The assessment was based on standardized fitness tests issued by the Ministry of Education and Training.

The results of the assessment are presented in Tables 3 and 4.

Table 3: Physical fitness of male students before the experiment

No.	Test	Male students before the experiment (n = 16)			
		\bar{x}	$\pm\sigma$	C_v	ε
1	Dominant hand grip strength (kg)	37,69	1,37	3,64	0,02
2	Sit-ups in 30 seconds (reps)	14,69	0,70	4,79	0,02
3	Standing broad jump (cm)	194,31	3,75	1,93	0,01
4	30m sprint from high start (seconds)	6,08	0,16	2,63	0,01
5	4 x 10m shuttle run (seconds)	12,78	0,44	3,48	0,02
6	Moderate-intensity running for 5 minutes (meters)	918,75	8,85	0,96	0,01

According to the data in Table 3, all physical fitness assessment tests for male students with low fitness levels at High School of Education Practice - Can Tho University show high consistency ($C_v = 0.96 - 4.79 < 10\%$); the relative error of the mean value is $\varepsilon < 0.05$, indicating that the sample is reliable and representative.

Table 4: Physical fitness of female students before the experiment

No.	Test	Female students before the experiment (n = 22)			
		\bar{x}	$\pm\sigma$	C_v	ε
1	Dominant hand grip strength (kg)	25,34	1,24	4,90	0,02
2	Sit-ups in 30 seconds (reps)	13,05	1,25	9,60	0,04
3	Standing broad jump (cm)	148,95	7,77	5,21	0,02
4	30m sprint from high start (seconds)	7,21	0,48	6,64	0,03
5	4 x 10m shuttle run (seconds)	13,56	0,19	1,42	0,01
6	Moderate-intensity running for 5 minutes (meters)	798,86	9,25	2,79	0,01

Similar to Table 3, the results shown in Table 4 show that all physical fitness assessment tests for female students with low fitness levels also have high consistency ($C_v = 1.42 - 9.60 < 10\%$); the relative error of the mean value is $\varepsilon < 0.05$, confirming that the sample is reliable and representative.

After the 4-month experimental period, the study evaluated the effectiveness of the selected physical development exercises by assessing students' physical fitness levels using the standard fitness assessment criteria issued by the Ministry of Education and Training. Growth rates and paired-sample t-tests were calculated. The results are presented in Tables 5 and 6.

Table 5: Physical fitness of male students after the experiment

No.	Test	Pre-test		Post-test		w	t	P
		\bar{x}	$\pm\sigma$	\bar{x}	$\pm\sigma$			
1	Dominant hand grip strength (kg)	37,69	1,37	39,58	2,77	4,89	3,59	0,05
2	Sit-ups in 30 seconds (reps)	14,69	0,70	15,19	0,75	3,35	2,99	0,05
3	Standing broad jump (cm)	194,31	3,75	197,50	1,97	1,63	1,83	0,05
4	30m sprint from high start (seconds)	6,08	0,16	5,79	0,13	4,62	2,74	0,05
5	4 x 10m shuttle run (seconds)	12,78	0,44	12,36	0,26	3,35	3,67	0,05
6	Moderate-intensity running for 5 minutes (meters)	918,75	8,85	970,00	8,16	6,00	2,05	0,05

As indicated by Table 5, there was a clear improvement in the physical fitness of male students with low fitness levels after the 4-month experiment. The performance of male students increased in all test categories, and the improvements were statistically significant ($t_{\text{calculated}} > t_{\text{table}}$, $P < 0.05$). This indicates that the physical fitness of male students improved after applying the selected physical development exercises. Among the tests, the 5-minute moderate-intensity run showed the highest average growth rate ($w = 6.00\%$), while the standing broad jump showed the lowest ($w = 1.63\%$).

Table 6: Physical fitness of female students after the experiment

No.	Test	Pre-test		Post-test		w	t	p
		\bar{x}	$\pm\sigma$	\bar{x}	$\pm\sigma$			
1	Dominant hand grip strength (kg)	25,34	1,24	26,45	0,42	4,30	2,52	0,05
2	Sit-ups in 30 seconds (reps)	13,05	1,25	13,68	0,89	4,76	3,59	0,05
3	Standing broad jump (cm)	148,95	7,77	155,23	6,26	4,13	4,04	0,05
4	30m sprint from high start (seconds)	7,21	0,48	6,75	0,24	6,67	2,47	0,05
5	4 x 10m shuttle run (seconds)	13,56	0,19	13,10	0,16	3,50	2,07	0,05
6	Moderate-intensity running for 5 minutes (meters)	798,86	9,25	870,91	16,81	8,63	2,28	0,05

Similar to their counterpart, female students with low fitness levels also showed noticeable improvement after the 4-month experiment. Performance increased in all test categories, and the improvements were statistically significant ($t_{\text{calculated}} > t_{\text{table}}$, $P < 0.05$). This demonstrates that the physical fitness of female students improved following the application of the selected physical development exercises. The 5-minute moderate-intensity run had the highest average growth rate ($w = 8.63\%$), while the standing broad jump had the lowest ($w = 4.13\%$).

3.3 Evaluation of physical fitness results for low-fitness students at the High School of Education Practice - Can Tho University after the experiment

The physical fitness results of low-fitness students at the High School of Education Practice - Can Tho University were evaluated based on the fitness classification standards issued by the Ministry of Education and Training. The results were compiled and are presented in Table 7.

Table 7: Evaluation of physical fitness of low-fitness students at the High School of Education Practice - Can Tho University, after the experiment, according to the Ministry of Education and Training's standards

No.	Test	Gender	n=38 students (16 males, 22 females)					
			Good		Passed		Unpasses	
			n	%	n	%	n	%
1	Dominant hand grip strength (kg)	Male	4	25	12	75	-	-
	Sit-ups in 30 seconds (reps)	Female	8	36,36	14	63,64	-	-
2	Standing broad jump (cm)	Male	-	0	16	100	-	-
	30m sprint from high start (seconds)	Female	4	18,18	18	81,82	-	-
3	4 x 10m shuttle run (seconds)	Male	3	18,75	13	81,25	-	-
		Female	9	40,91	13	59,09	-	-
4	Dominant hand grip strength (kg)	Male	1	6,25	15	93,75	-	-
	Sit-ups in 30 seconds (reps)	Female	1	4,55	21	95,45	-	-
5	Standing broad jump (cm)	Male	4	25	12	75	-	-
	30m sprint from high start (seconds)	Female	10	45,45	12	54,55	-	-
6	4 x 10m shuttle run (seconds)	Male	1	6,25	15	93,75	-	-
		Female	5	31,25	17	68,75	-	-

As shown in Table 7, the post-experiment fitness results of low-fitness students at the High School of Education Practice - Can Tho University improved significantly compared to before the experiment. Before the experiment, none of the students had passed the Ministry of Education and Training's standard tests. After the experiment, all of them managed to meet the standards, even many achieving a "good" rating. These results confirm that the selected exercises had a positive effect on the physical fitness of the experimental group.

4. Conclusion

The study selected 10 exercises to improve physical fitness for low-fitness students at the High School of Education Practice, Can Tho University, including 1 exercise for speed development, 2 for strength development, 3 for endurance development, 2 for flexibility/agility, and 2 for motor coordination.

The application of these 10 exercises in practice showed that after the experiment, all physical fitness evaluation criteria for the students improved significantly, with statistical significance ($P < 0.05$); 100% of the students met the physical fitness standards set by the Ministry of Education and Training.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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