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SELECTION OF PHYSICAL FITNESS DEVELOPMENT EXERCISES FOR MALE ATHLETES OF THE FIVE-A-SIDE FOOTBALL TEAMS AT KIEN LUONG HIGH SCHOOL, KIEN LUONG DISTRICT, KIEN GIANG PROVINCE, VIETNAM

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Abstract:
Football is a highly competitive and physically demanding sport. Since football matches last for a long duration (90 minutes) on a large field, athletes must continuously move, leading to significant physical exertion. Therefore, physical fitness is a crucial and essential factor for modern football players. This study aims to select a set of exercises to enhance the physical fitness of male athletes on the five-a-side football teams at Kien Luong High School, Kien Giang Province, Vietnam. To do it, the research has employed conventional methods, including literature synthesis and analysis, interviews, pedagogical testing, pedagogical experiments, and statistical mathematics. The research subjects include 12 male athletes from the five-a-side football teams at Kien Luong High School, Kien Giang Province, Vietnam. The study identified 29 exercises to develop the physical fitness of these athletes, including 3 speed exercises, 14 strength exercises, 3 endurance exercises, 2 flexibility exercises, and 7 coordination exercises. The application of these exercises in practice showed a statistically significant improvement in the physical fitness of the subjects after the experiment ($P<0.05$).

Keywords: exercises, physical fitness, five-a-side football, male athletes, Kien Luong High School

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1. Introduction

Football is a sport characterized by intense competition and physical confrontation. During a match, both teams fiercely compete to score goals while simultaneously defending against the opponent's attacks.

Modern football requires players not only to possess exceptional technical proficiency and comprehensive physical attributes but also to develop advanced cognitive intelligence. Football intelligence is a specialized form of knowledge found in outstanding players, characterized by exceptional quick thinking that enables them to grasp situations, anticipate match developments, and respond swiftly and effectively in various scenarios. "Reading the game" refers to the ability to interpret the intentions of teammates and opponents, allowing for appropriate and strategic reactions that align with the dynamics of the match. Intelligence in football is inherently linked to tactical thinking. The ability to assess situations rapidly and devise optimal solutions plays a crucial role in identifying favorable opportunities and executing precise actions in real time, ultimately determining the effectiveness of tactical decision-making [1].

Due to the extended duration of a football match (90 minutes) on a large field, players experience substantial physical exhaustion. A footballer can run between 6 to 10 km per match, executing over 100 technical movements with and without the ball. According to statistics, in a highly intense match, players may expend over 2000 kcal, leading to a body weight reduction of 3 to 5 kg.

Modern football necessitates the development of all physical qualities. Players typically cover 10 to 15 km per match, incorporating different running intensities: sprinting (1000-1200m), fast running (1400-2800m), jogging (2000-9000m), and walking (4000m) [3].

Research by Withers (1982) and Van Gool (1988) indicates that sprinting accounts for 18% of the total distance, with speeds ranging from 6.92 to 8.15 m/s over distances of 30-50m. Medium-speed running and jogging constitute 44% of the distance, at speeds between 2.04 and 6.92 m/s, while walking accounts for approximately 36%, with speeds from 1.3 to 2.04 m/s [4].

To maintain high performance throughout a 90-minute match, football players require strong aerobic and anaerobic endurance.

Running ability also plays a crucial role in football as it is the fundamental technical means of movement on the field. Running techniques include regular running, backward running, lateral movement, curved running, zig-zag running, body rotation, etc. The application of each running movement depends on specific match situations. The running movements in football are characterized by rapid acceleration, sudden changes in speed, and a combination of different body parts. Their movement patterns also involve different rhythms, speeds, and distances. In addition to varying running speeds, players are required to be able to stop abruptly and change direction. At times, they may sprint at extremely high speeds. According to Bloomfield J. (2007) [5], in a 90-minute

match, the average percentage of purposeful running time, including regular running, high-speed running, and sudden sprints, is 35.8% for forwards, 44.5% for midfielders, and 41.9% for defenders. The total running distance covered by a player in a match ranges from 8 to 10 km (as per Reilly) and from 10 to 15 km (as per Bangsbo) [6].

Football is a direct-contact sport where physical confrontations such as shoving and pushing frequently occur. Therefore, during competition, athletes require significant strength to gain an advantage. Additionally, players must execute technical movements under high-intensity conditions, continuously changing direction while experiencing physical collisions. As a result, maintaining good balance and flexibility is essential.

Given these factors and the pressing need to enhance team training while also contributing to physical education and fitness development for students, the authors have undertaken this research study: S*election of physical fitness development exercises for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province, Vietnam*.

2. Methodology

2.1 Research Methods

The Literature Synthesis and Analysis Method is used to systematize knowledge related to the research field, providing a foundation for the study. It also helped in selecting appropriate research methods and choosing physical fitness development exercises for the research subjects.

The Interview Method involves consulting experts, specialists, and coaches to select physical fitness development exercises suitable for five-a-side football players.

The Pedagogical Testing Method is employed to assess the physical fitness of male athletes from the five-a-side football teams at Kien Luong High School, Kien Giang Province.

The Pedagogical Experiment Method is to evaluate the effectiveness of applying selected physical fitness development exercises over one academic year. The experimental subjects consisted of 12 male athletes from the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province, Vietnam. The experiment was conducted at Kien Luong High School.

Mathematical Statistics Method to process the data collected with the use of SPSS 22.0 software.

2.2 Research Participants

- **Testees:** 12 male athletes from the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province.
- **Surveyees:** 30 experts, coaches, sports managers, teachers, and referees specializing in football and five-a-side football.

3. Results and Discussion

3.1 Selection of physical fitness exercises to develop the physical strength of male athletes of the five-a-side football teams of Kien Luong High School, Kien Luong District, Kien Giang Province

The study has followed these steps to select physical fitness development exercises for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province.

- **Step 1:** Compiling physical fitness development exercises from previous research conducted by both domestic and international experts.
- **Step 2:** Conducting surveys with experts, specialists, and coaches to finalize a selection of physical fitness development exercises for the athletes.

3.1.1 Compilation of physical fitness development exercises from previous research conducted by both domestic and international experts

To select exercises to develop physical fitness for male athletes of the five-a-side football teams of Kien Luong High School, Kien Luong District, Kien Giang Province, the authors have synthesized the suggested exercises in published scientific works of Nguyen Van Chinh (2023) [7]; Hoang Minh Chien (2020) [8]; Le Ngoc Han Thuyen (2017) [9]; Trinh Huu Loc – Ngo Huu Phuc – Lam Van Vu – Pham Thai Vinh (2015) [10], Ho Dac Son et al (2022) [11], Lam Phuoc Binh (2012) [12], Ha Viet Dung (2016) [13], Tran Manh Hung (2023) [14], Vu Dinh Mai (2019) [15], Dang Van Nhan (2016) [16], Pham Thanh Phi (2017) [17]. This phase has found 37 physical development exercises for the football athletes.

3.1.2 Surveys with experts and coaches to shortlist the exercises

The researchers conducted a survey using questionnaires distributed to 30 experts, coaches, and lecturers with extensive experience in football training and education. The purpose was to select the most suitable exercises for developing physical fitness in football for the research subjects. The responses were ranked based on usage priority as follows:

- Frequently used – 2 points,
- Occasionally used – 1 point,
- Not used – 0 points.

Table 1 indicates that:

For all exercises, the calculated χ^2 value was lower than the critical χ^2 table value (3.84) at a significance level of $P > 0.05$. This means that the differences between the two rounds of expert interviews were not statistically significant at $P > 0.05$. Therefore, the responses from experts, coaches, and subject-specialized teachers showed a high level of consistency across both interview rounds.

Table 1: Survey results of selection of physical development exercises for male athletes of the five-a-side football teams of Kien Luong High School, Kien Luong District, Kien Giang Province, Vietnam

No.	Exercise	1st (n = 30)		2nd (n = 30)		Result	
		Total	%	Total	%	◎◎◎	P
1	10m Forward-Backward Sprint	58	97	60	100	1.02	>0.05
2	10m Sprint	39	65	48	80	1.69	>0.05
3	30m Sprint	59	98	58	97	0.17	>0.05
4	100m Sprint	43	72	48	80	0.57	>0.05
5	400m Sprint	40	67	47	78	1.02	>0.05
6	5x30m Sprint	60	100	59	98	0.50	>0.05
7	15m single-leg hopping	59	98	58	97	0.17	>0.05
8	Prone push-ups	57	95	59	98	0.52	>0.05
9	Supine sit-ups	56	93	58	97	0.35	>0.05
10	Supine leg raises	52	87	57	95	1.25	>0.05
11	Prone back extensions	52	87	56	93	0.74	>0.05
12	Plank	54	90	56	93	0.22	>0.05
13	Standing broad jump	52	87	57	95	1.25	>0.05
14	Vertical jump	44	73	47	78	0.20	>0.05
15	High jump with ball heading	54	90	55	92	0.05	>0.05
16	15m frog jumps	52	87	58	97	1.96	>0.05
17	Step jumps	50	83	57	95	2.11	>0.05
18	10-step broad jump	52	87	53	88	0.04	>0.05
19	Squat	52	87	55	92	0.39	>0.05
20	Lunge	53	88	56	93	0.45	>0.05
21	Weighted walk	48	80	56	93	2.31	>0.05
22	Hurdle jumps	42	70	46	77	0.34	>0.05
23	12-minute run (Cooper Test)	60	100	60	100	0.00	>0.05
24	YoYo Test	60	100	60	100	0.00	>0.05
25	3-minute jump rope	55	92	58	97	0.68	>0.05
26	5-minute self-paced run	47	78	46	77	0.02	>0.05
27	1500m run	40	67	45	75	0.50	>0.05
28	Forward bend stretch	60	100	60	100	0.00	>0.05
29	Hip flexibility stretch (Side split-front split)	60	100	60	100	0.00	>0.05
30	Obstacle jumping (5 hurdles) - 10m slalom run – 3-step broad jump	60	100	60	100	0.00	>0.05
31	25m slalom run	59	98	60	100	0.50	>0.05
32	30-second jump rope	42	70	48	80	0.80	>0.05
33	3-step approach and high jump header (30m)	60	100	57	95	1.54	>0.05
34	4x10m shuttle run	52	87	58	97	1.96	>0.05
35	Shuttle run (5m - 10m - 15m - 20m) (seconds)	54	90	57	95	0.54	>0.05
36	Sit down - stand up - back extension - push ups	54	90	56	93	0.22	>0.05
37	Ladder sprint drill	60	100	57	95	1.54	>0.05

Based on the interview results, we selected exercises with a total score equal to or greater than 80% across both interview rounds. According to this principle, the following exercises were chosen for the experiment on male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province:

- **3 Speed exercises:** 10m forward-backward sprint (2 sets × 2 reps, 30s rest between sets), 30m sprint (2 sets × 2 reps, 30s rest between sets), 5x30m sprint (2 sets × 1 rep, 30s rest between sets).
- **14 Strength exercises:** 15m single-leg hopping (2 sets × 2 reps, 30s rest between sets), prone push-ups (15 reps × 2 sets, 30s rest between sets), supine sit-ups (15 reps × 2 sets, 30s rest between sets), supine leg raises (15 reps × 2 sets, 30s rest between sets), prone back extensions (15 reps × 2 sets, 30s rest between sets), plank (40s × 2 sets, 30s rest between sets), standing broad jump (3 reps × 2 sets, 30s rest between sets), high jump with ball heading (5 reps × 2 sets, 30s rest between sets), 15m frog jumps (2 sets, 30s rest between sets), step jumps (30 reps × 2 sets, 30s rest between sets), 10-step broad jump (2 sets, 30s rest between sets), squats (sit down - stand up) (20 reps × 2 sets, 30s rest between sets), lunges (20 reps × 2 sets, 30s rest between sets), weighted walk (20m × 2 sets, 30s rest between sets).
- **3 Endurance exercises:** 12-minute run (Cooper test) (1 rep), Yoyo test (1 rep), 3-minute jump rope (1 rep).
- **2 Flexibility exercises:** forward bend stretch (2 sets × 2 reps, 15s rest between sets), hip flexibility stretch (side split - front split) (2 sets × 2 reps, 15s rest between sets).
- **7 Coordination exercises:** obstacle jumping (5 hurdles) - 10m slalom run - 3-step broad jump (2 sets, 30s rest between sets), 25m slalom run (2 sets, 30s rest between sets), 3-step approach & high jump header (30m) (2 sets, 30s rest between sets), 4x10m shuttle run (2 sets, 30s rest between sets), shuttle run (5m - 10m - 15m - 20m) (seconds) (2 sets, 60s rest between sets), sit down - stand up - back extension - push-ups (3 reps × 2 sets, 30s rest between sets), ladder sprint drill (1 rep).

3.2 Evaluation of the effectiveness of some physical development exercises for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province

To evaluate the effectiveness of applying the selected physical fitness development exercises for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province, we conducted the following steps:

- **Step 1:** Experimental planning.
- **Step 2:** Evaluation of experimental results.

3.2.1 Experimental Planning

The experimental training program was conducted over six months (from September 2023 to March 2024) within the 2023–2024 academic year. Initial data collection was carried out before the training period, followed by a post-experiment assessment after six

months of applying the selected exercises. The effectiveness of the exercises was evaluated based on predefined fitness tests outlined in this study.

3.2.2 Evaluation of Experimental Results

After completing the one-year experimental phase, we conducted fitness performance tests and processed the collected data. The research findings regarding the improvements in physical fitness test results for the male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province, following the experimental training program are presented in Table 2.

Table 2: The growth of physical fitness assessment tests for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province after the experiment

No.	Test	Pretest		Posttest (after 6 months)		W%	t_{value}	P
		$\overline{X}$	S_x	$\overline{X}$	S_x			
1	30m Sprint (s)	4.23	0.09	4.15	0.08	1.9	5.22	<0.05
2	4x10m shuttle run (s)	10.16	0.30	9.87	0.07	2.9	3.74	<0.05
3	Standing broad jump (cm)	224.8	5.42	233.7	5.73	3.9	13.24	<0.05
4	5x30m Sprint (s)	22.81	0.44	22.51	0.37	1.3	5.62	<0.05
5	25m slalom run (s)	6.50	0.30	6.30	0.19	3.1	4.43	<0.05
6	Yoyo Test (m)	555.0	40.11	578.3	34.60	4.1	4.77	<0.05
7	12-Minute Run (Cooper Test) (m)	2838	121.4	2984	90.4	5.0	8.25	<0.05
$\overline{W\%}$						3.2		

Df = 11, $t_{0.05}$ = 2.201

The results presented in Table 2 indicate the following:

The 30m sprint test showed an average post-experiment value of 4.15s, improving by 0.8s from the initial test, with a growth rate of 1.9% ($t = 5.22 > t_{0.05} = 2.201$, at $P < 0.05$).

The 4x10m shuttle run test recorded an average post-experiment value of 9.87s, an improvement of 0.27s, with a growth rate of 2.9% ($t = 3.74 > t_{0.05} = 2.201$, at $P < 0.05$).

The standing broad jump test showed an increase in distance from 224.8 cm to 233.7 cm, with a growth rate of 3.9% ($t = 13.24 > t_{0.05} = 2.201$, at $P < 0.05$).

The 5x30m sprint test improved from 22.81s to 22.51s, with a growth rate of 1.3% ($t = 5.62 > t_{0.05} = 2.201$, at $P < 0.05$).

The 25m slalom run test recorded an improvement of 0.2s, with a growth rate of 4.1% ($t = 4.43 > t_{0.05} = 2.201$, at $P < 0.05$).

The yoyo test results increased from 555.0m to 578.3m, with a growth rate of 4.1% ($t = 4.77 > t_{0.05} = 2.201$, at $P < 0.05$).

The 12-minute run (Cooper test) showed the highest improvement, increasing from 2838m to 2984m, with a growth rate of 5.0% ($t = 8.25 > t_{0.05} = 2.201$, at $P < 0.05$).

The overall analysis indicates that the physical fitness of the research subjects improved significantly after the experimental period, with a statistically significant difference at $P < 0.05$. The average growth rate (W) across all tests was 3.2%, with the 12-

minute run (Cooper test) showing the highest growth (5.0%), while the 5x30m sprint test recorded the lowest growth rate (1.3%).

These findings confirm that the selected training exercises effectively contributed to improving the athletes' fitness performance, reinforcing the suitability of the training program.

4. Conclusion

Through literature synthesis and expert interviews, a total of 29 physical fitness development exercises were selected for male athletes of the five-a-side football teams at Kien Luong High School, Kien Luong District, Kien Giang Province. These include 3-speed exercises, 14 strength exercises, 3 endurance exercises, 2 flexibility exercises, and 7 coordination exercises.

The practical application of these 29 exercises demonstrated a positive impact on the improvement of physical fitness test results for the experimental subjects, confirming their effectiveness in enhancing athletic performance.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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Thanh Minh Dang has been a physical education teacher at Can Tho University, Vietnam.
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