



Selection of professional fitness exercises for Male Badminton Athletes of Tra Vinh University

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Abstract

Badminton is considered to be one of the most popular and rapidly developing sports in Vietnam. To play this sport well, the players are required a strong physical foundation; hence, physical fitness is a crucial factor for a modern badminton athlete. The study aims to select specialized physical development exercises for male athletes of the Tra Vinh University badminton team. The Participants is 10 male badminton players from the Tra Vinh University team. The study utilized standard research methods in sports science, including literature review, interviews, educational testing, and statistics proceeded in three steps involving document synthesis, interviews, and test evaluation. Finally, eleven fitness exercises are chosen in the study.

Keywords: Exercise, physical fitness, badminton, Tra Vinh University

Introduction

Badminton was first introduced to Vietnam in the early 1960s. Although it arrived later than some other sports, it quickly gained popularity across provinces, cities, and the entire country. The appeal of badminton lies in its simplicity, as it does not require extensive facilities, which makes it suitable for many countries, including Vietnam, where economic conditions may not allow for more resource-intensive sports. However, in terms of physical fitness and technical skills, Vietnamese badminton players still lag behind their global counterparts. For instance, up to now, there is only Nguyen Tien Minh who has managed to achieve a top-10 ranking in international competitions.

In Tra Vinh City, badminton is an essential part of daily life, with clubs, schools, and workplaces all promoting its practice. As a result, it is not surprising that the sport is being enjoyed by more and more students at Tra Vinh University, making it from a just-for-fun game to a highly competitive one. For example, men's singles and doubles competitions currently attract significant attention from the local community. Despite an increasing number of students participating in badminton training, selecting high-quality players for the university team remains challenging. The reason is that most of them play recreationally without formal training, resulting in their skills and fitness being unsatisfying for a competition. Hence, to ensure the players are adequately prepared for contests, the coaches need to thoroughly assess their abilities to tailor training exercises. Recognizing the importance of this, two researchers conducted a study called "*Selection of professional fitness exercises for male badminton athletes of Tra Vinh University*".

The study aims to determine appropriate fitness exercises to enhance physical strength and skills for the male badminton team of Tra Vinh University.

Methodology

Research methods

The literature review aims to consolidate relevant documents related to specialized physical fitness in badminton, establishing the theoretical foundation for the study and allowing for the identification of research objectives, and discussion of findings.

The interview method involves using questionnaires to gather opinions from experienced coaches from Tra Vinh province and lecturers from Ho Chi Minh City University of Physical Education and Sport and Ho Chi Minh City University of Sport, contributing to the selection of fitness exercises for male badminton players in the Tra Vinh University team.

The pedagogical assessment method aims to assess the specialized physical fitness of the participants.

Statistical analysis is used to analyse the collected data with SPSS 22.0.

Participants

Participants in Physical Fitness and Technical Assessment: 10 male badminton players from the Tra Vinh University team

Interviewees: 30 people who are currently badminton experienced coaches and experts in badminton instruction

Results

1. Selection of fitness exercises to enhance professional physical strength for male athletes of the Tra Vinh University Badminton team.

To select appropriate professional fitness exercises for male athletes of the Tra Vinh University Badminton team, this study proceeded in two steps as follows.

Step 1: Synthesizing professional fitness exercises suggested by domestic and foreign researchers

Step 2: Interviewing PE teachers, lecturers, coaches, and administrative staff to select some exercises

Synthesizing professional fitness exercises from research works of domestic and foreign authors

The authors conducted a synthesis of research works of Thuy Ha Nguyen, Quy Binh Nguyen (2000) ^[19], D.P. Gunalan (2001) ^[4], Vinh Huy Chau (2007) ^[6], The Huy Nguyen (2005) ^[8], My Le Banh, Chinh Khanh Hau (2000) ^[10], Hong Son Le (2006) ^[16], Sports Committee (1999) ^[2], Van Vinh Tran, Chi Thanh Dao (1998) ^[24], Tuan Khoi Dam (2012) ^[9], Nguyet Nga Le, Quang Vinh Nguyen, Thanh De Nguyen (2016) ^[13], Thanh Tung Mai (2007) ^[23], Thai Phuong Pham (2023) ^[15].

To shortlist the exercises for male badminton athletes at Tra Vinh University, the research adhered to the following principles:

- Choose exercises with a high frequency of usage (50% or more) among practitioners
- Choose exercises that are suitable for the local conditions

Finally, the study selected 29 professional fitness exercises (see Table 1).

Interviewing PE teachers, lecturers, coaches, and administrative staff to determine certain exercises to enhance the professional physical fitness of male athletes of Tra Vinh University Badminton team

The researchers conducted two rounds of interviews with a survey form. The interviews were spaced one month apart, with responses scored as follows:

Frequently used: 2 points

Occasionally used: 1 point

Never used: 0 points.

The two rounds of interviews gathered 62 responses in total. Among these, 11 responses from the coaches represented

18%, 13 responses from the PE teachers accounted for 22%, 31 responses from the lecturers made up 52%, and 5 responses from administrative staff comprised 8%.

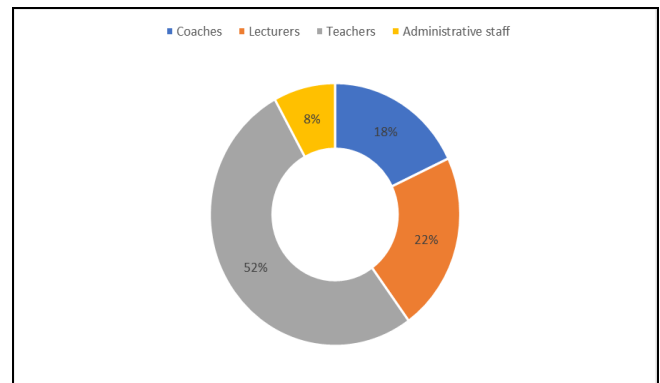


Fig 1: Interviewees

To check the coincidence of the results of the two interviews, compare them through the index χ^2 (square) (Table 1).

Table 1: Comparison of the two interview results about the professional fitness exercises for male badminton team athletes at Tra Vinh University

No.	EXERCISES	1st (n = 32)		2nd (n = 30)		χ^2	P
		Σ points	%	Σ points	%		
1	12-minute run	45	68	36	56	0.01	> 0.05
2	30-meter leapfrog x 3 times	59	89	58	91	0.03	> 0.05
3	30-meter sprint x 5 times	63	95	59	92	0.02	> 0.05
4	60-meter sprint x 5 times	45	68	43	67	0.01	> 0.05
5	400-meter run x 2 times	39	59	32	50	0.01	> 0.05
6	800-meter run x 2 times	43	65	43	67	0.01	> 0.05
7	10-minute rope jump	46	70	44	69	0.01	> 0.05
8	30-meter zigzag run x 3 times	45	68	45	70	0.01	> 0.05
9	2-minute rope jump x 2 times	46	70	44	69	0.01	> 0.05
10	Maximum sit-ups for 30 seconds x 3 times	44	67	38	59	0.01	> 0.05
11	Maximum push-ups for 30 seconds x 3 times	63	95	56	88	0.03	> 0.05
12	1-minute rope jump x 2 times	58	88	55	86	0.02	> 0.05
13	4 corner drills for 2 minutes x 3 times	58	88	50	78	0.01	> 0.05
14	8 corner drills for 2 minutes x 2 times	41	62	39	61	0.01	> 0.05
15	2 net corner drill and continuously hit shuttlecocks for 1 minute x 2 times	58	88	57	89	0.01	> 0.05
16	2 end corner drill and hit shuttlecocks along the line for 1 minute x 2 times	42	64	42	66	0.01	> 0.05
17	Foot jump of both sides for 30 seconds x 2 times	61	92	58	91	0.03	> 0.05
18	Collaborative movement to hit shuttlecocks x 30 times x 3 sets	42	64	39	61	0.01	> 0.05
19	Move sideways and hit shuttlecocks for 1 minute x 3 times	58	88	51	80	0.02	> 0.05
20	Hit shuttlecocks against the wall for 2 minutes x 3 times	42	64	59	92	0.01	> 0.05
21	Pick up shuttlecocks at 6 points on the court for 1 minute x 2 times	60	91	60	94	0.02	> 0.05
22	4 corner drills for 2 minutes x 2 times	45	68	34	53	0.01	> 0.05
23	Jump and hit shuttlecocks for 30 seconds x 2 times	53	80	52	81	0.02	> 0.05
24	Run and hit shuttlecocks along the line and straight up to the net for 2 minutes x 3 times	36	55	30	47	0.01	> 0.05
25	Jump forward on one foot and switch foot when landing for 30 seconds x 2 times	46	70	42	66	0.01	> 0.05
26	Move sideways for 1 minute x 2 times	46	70	38	59	0.01	> 0.05
27	4 corner drills and collaboratively hit shuttlecocks for 2 minutes x 3 times	45	68	38	59	0.01	> 0.05
28	Jump and hit shuttlecocks for 30 seconds x 2 times	43	65	41	64	0.01	> 0.05
29	Move and hit shuttlecocks along the line and straight up to the net for 1 minute x 3 times	55	83	50	78	0.02	> 0.05

Table 1 shows that the research results from two interview sessions of the exercises all have χ^2 calculated < χ^2 table (=3.84) at a probability threshold $P > 0.05$, so the difference between the two observed mean values is not statistically significant at the probability threshold $P > 0.05$. Therefore,

the interview results of the experts, coaches, and lecturers are highly consistent in their responses.

Regarding the selection of exercises, which exercises scored above 75% in both interview sessions (Session 1 > 53 points, Session 2 > 50 points) would be chosen. The study

selected 11 fitness exercises and 10 skills-enhancing exercises for male badminton players as follows:

Selected professional fitness exercises:

1. 30-meter leapfrog
2. 30-meter sprint
3. Maximum push-ups for 30 seconds
4. 1-minute rope jump
5. 4 corner drills
6. 2 net corner drill and continuously hit shuttlecocks
7. Foot jump on both sides
8. Move sideways and hit shuttlecocks
9. Pick up shuttlecocks at 6 points on the court
10. Jump and hit shuttlecocks
11. Move and hit shuttlecocks along the line and straight up to the net

2. Evaluating the effectiveness of the professional fitness exercises for male athletes of the Tra Vinh University badminton team.

Objective: The experiment aims to explore the effectiveness of applying those professional fitness

exercises to enhance the performance of male athletes of the Tra Vinh University badminton team

Location: Tra Vinh University (126 Nguyen Thien Thanh, Ward 5, Tra Vinh City)

Participants: 10 male athletes from the Tra Vinh University badminton team.

Length of the experiment: 5 months (October 31, 2022 – March 31, 2023) (with 2 weeks off for the Lunar New Year).

Details: Training sessions were held 3 times per week, with each session lasting 120 minutes (2 hours). The total number of training sessions was 51 sessions (see Table 2).

Assessment: The experiment plan was carried out over five months (from October 2022 to March 2023) with 2 assessments. The initial assessment was to measure the professional fitness and skills of the male badminton players. After the experiment, the second assessment was conducted to evaluate the effectiveness of the selected exercises towards the performance of the athletes.

Table 2: Process of conduction

Exercise Week	1	2	3	4	5	6	7	8	9	10	11
Week 1	1	x				x	x				x
	2		x		x			x		x	
	3			x		x			x		x
Week 2	4	x				x	x				x
	5		x		x			x		x	
	6			x		x			x		x
Week 3	7	x				x	x				x
	8		x		x			x		x	
	9			x		x			x		x
Week 4	10	x				x	x				x
	11		x		x			x		x	
	12			x		x			x		x
Week 5	13	x				x	x				x
	14		x		x			x		x	
	15			x		x			x		x
Week 6	16		x	x				x	x		
	17	x			x	x				x	
	18		x				x	x			x
Week 7	19		x	x				x	x		
	20	x			x	x				x	
	21		x				x	x			x
Week 8	22		x	x				x	x		
	23	x			x	x				x	
	24		x				x	x			x
Week 9	25		x	x				x	x		
	26	x			x	x				x	
	27		x				x	x			x
Week 10	28		x	x				x	x		
	29	x			x	x				x	
	30		x				x	x			x
Week 11	31		x	x				x	x		
	32	x			x	x				x	
	33		x				x	x			x
Week 12	34			x		x			x		x
	35				x	x		x	x		
	36	x	x							x	x
Week 13	37			x		x			x		x
	38				x	x		x	x		
	39	x	x							x	x
Week 14	40			x		x			x		x
	41				x	x		x	x		

	42	x	x								x	x
Week 15	43			x			x			x		x
	44				x	x		x	x			
	45	x	x								x	x
	46			x			x			x		x
Week 16	47				x	x		x	x			
	48	x	x								x	x
	49			x			x			x		x
Week 17	50				x	x		x	x			
	51	x	x								x	x

To evaluate the effectiveness of the selected exercises, the study measured the performance of the ten male athletes using the following tests [15]: Test 1: Vertical jump (cm), Test 2: One-minute rope skipping (times), Test 3: Far throw of a badminton shuttlecock (meters), Test 4: Ten times lateral shuttle run (seconds)

Test 5: Ten times forward-backwards shuttle run (seconds).

Using the growth rate index, the study tried to compare the average results of the specialized physical fitness tests among the participants before and after the experiment. The results are presented in Table 3.

Table 3: The growth rate of professional fitness tests of male athletes of the Tra Vinh University badminton team after the experiment

No.	Tests	\bar{X}_{BE}	S	\bar{X}_{AF}	S	\bar{w}	t	P
1	Vertical jump (cm)	57.81	1.71	59.99	3.94	3.56	2.63	<0.05
2	One-minute rope skipping (times)	121.80	2.30	145.60	3.81	17.78	14.59	<0.05
3	Far throw of a badminton shuttlecock (meters)	7.19	0.16	7.54	0.11	4.79	14.82	<0.05
4	Ten times lateral shuttle run (seconds)	42.46	0.59	38.86	0.53	8.84	15.88	<0.05
5	Ten times forward-backward shuttle run (seconds)	51.98	0.64	48.44	0.66	7.05	16.38	<0.05
						\bar{w}	8.41	

Df = n - 1 = 9, $t_{0.05} = 2.262$

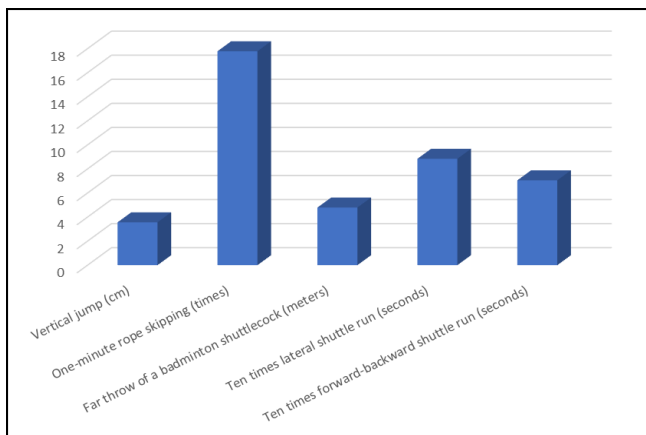


Fig 2: Performance growth among the male athletes of the Tra Vinh University badminton team after the experiment

Table 3 reveals that there are statistically significant differences ($P < 0.05$) in the performances of the male badminton athletes before and after the experiment. This is indicated by the average value \bar{X} at the probability threshold $P < 0.05$ while $t_{calculated} > t_{0.05} = 2.262$. The growth in fitness performances is illustrated in Fig 2 below.

It is evident that after the experiment, there is an enhancement in the physical prowess of male athletes of the Tra Vinh University badminton team. This is demonstrated by the statistically significant difference at the probability threshold $P < 0.05$, and $t_{calculated} > t_{0.05} = 2.262$ along with the average growth rate $\bar{w} = 8.41\%$. In other words, their performances considerably improve after the training. The one-minute jump rope test showed the highest average growth rate at 17.78%, and the standing vertical jump test demonstrated the lowest average growth rate at 3.56%. These results indicate that the exercises can enhance the

professional fitness of male badminton athletes at Tra Vinh University.

Conclusion

The research has successfully selected 11 professional fitness exercises for male badminton athletes at Tra Vinh University, including:

- 30-meter leapfrog x 3 times
- 30-meter sprint x 5 times
- Maximum push-ups for 30 seconds x 3 times
- minute rope jump x 2 times
- 4 corner drills for 2 minutes x 3 times
- 2 net corner drill and continuously hit shuttlecocks for 1 minute x 2 times
- Foot jump of both sides for 30 seconds x 2 times
- Move sideways and hit shuttlecocks for 1 minute x 3 times
- Pick up shuttlecocks at 6 points on the court for 1 minute x 2 times
- Jump and hit shuttlecocks for 30 seconds x 2 times
- Move and hit shuttlecocks along the line and straight up to the net for 1 minute x 3 times

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