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Selection of fitness tests for 13-year-old talented male Football players in an Giang province, Vietnam

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Abstract
Football is a globally popular sport, attracting millions of people around the world and over 200 countries participating in the Fédération Internationale de Football Association (FIFA). This study aims to select fitness tests to assess the physical strength of 13-year-old male athletes from the An Giang province's talented football team. The study involves twenty two talented young male football athletes of the team and twenty football experts and coaches. The research employs popular research methods in the field of sports science, including literature synthesis, interviews, pedagogical testing, and statistical analysis in order to determine seven fitness tests. The seven tests include 30-meter sprint (s), 15-meter sprint (s), Standing long jump (cm), 2000-meter run (s), 5x30 meter shuttle run (s), 505 agility test (s) and Sit and reach test (cm). The use of the tests to evaluate the current physical fitness of young football players indicates that 13-year-old male athletes from the An Giang province football team have better strength compared to the U13 PVF athletes, and are comparable in speed and flexibility. However, the An Giang's team performs worse in endurance, speed endurance and agility.

Keywords: Fitness tests, physical strength, football, An Giang province

Introduction

The world has witnessed the remarkable development of football over more than a century. Starting with just seven founding members, FIFA now has over 200 members [1, 2]. This growth demonstrates the status of football as the "King of Sports," boasting the largest global fan base [3].

Football is a team sport, full of surprises and diversity, making it highly captivating. Modern football demands a high level of physical fitness in all aspects as its players are required to constantly move and switch during the 90 to 120 minutes of a match. The footballers cover a total distance of 10,000 to 15,000 meters, including various forms of movement such as running, walking, short sprints, medium-speed runs, and slow runs [5]. Moreover, high levels of physical fitness enable players to execute technical actions accurately and maintain their concentration during an intense match. Therefore, they need to have four comprehensively developed physical fitness elements regarding strength, endurance, speed, and flexibility.

Vietnamese people also have a great passion for this sport, which leads football to be a national pastime. Over more than a hundred years of development, Vietnamese football has achieved significant achievements including the Silver Medal at the SEA Games in the U19 and U21 men's football, the Silver Medal at the 1998 Tiger Cup, the Bronze Medal at the 20th SEA Games, and most notably, the Championship at the 2008 AFF Cup. However, the real data from domestic football competitions and the assessments of sports experts indicate that the current physical fitness and technical level of Vietnamese players do not meet the standards. This shortfall is due to several factors, but the primary cause is the unscientific use of fitness tests over the years.

Recognizing the urgency of the issue, the study "*Selection of Fitness Tests for 13-Year-Old Talented Male Football Players in An Giang Province, Vietnam*" was undertaken.

Material & methods

Methods

The study employed four research methods as follows

- Literature synthesis: to build a theoretical foundation from research results in the field of football
- Interview: to shortlist appropriate physical fitness tests for 13-year-old male football athletes in An Giang province; to use questionnaires with three-scale responses (frequently used, occasionally used, not used)
- Pedagogical testing: to assess the physical fitness status of 13-year-old football athletes in An Giang province
- Statistical analysis: to analyze the collected data with the use of SPSS 20.0 software

Participants

- **Testees:** 22 talented male football athletes in An Giang province aged 13
- **Interviewees:** 20 football trainers working at sports training centers in Ho Chi Minh City, Long An Province, Dong Thap Province, Can Tho Province, and An Giang Province.

Results

1. Selection of the fitness tests for 13-year-old male athletes of the An Giang province's talented football team

The selection of fitness tests was conducted through the three following steps.

Step 1: Synthesizing the fitness tests commonly used or recommended by domestic and foreign authors

Step 2: Shortlisting the tests based on the votes of the trainers

Step 3: Testing the reliability of the selected tests

Synthesis of the fitness tests commonly used or recommended by domestic and foreign authors

A number of well-known authors in the field of developing fitness tests for international and Vietnamese football athletes include John Jaman (1976) [7], Tinh Nguyen Thiet (1997) [8], Cu Nguyen Ngoc (1998) [9], Alagich. R (1998) [10], Truyen Nguyen The, Phuong Le Quy, Minh Nguyen Kim, Nhuan Nguyen Duc, Tuyet Nguyen Thi (1999) [11], Dien Ma Thuyet (2001) [12], Huyen Thanh (2001) [13], Truyen Nguyen The, Minh Nguyen Kim, Tuan Tran Quoc (2002) [14], Vietnam Football Federation (2004) [15], Chi Duong Nghiep (2004) [16], Yen Nguyen Hoang (2015) [17], Quyet Vo Van (2016) [18], Nga Le Nguyet, Vinh Nguyen Quang, De Nguyen Thanh (2016) [19], Hien Duong Van (2018) [20], Luc Nguyen Dang, Nhiem Bui Hoan, Vinh Nguyen Quang (2022) [21], Hung Giang Phi (2023) [22].

The authors compiled 27 commonly used tests to evaluate the physical fitness of adolescent football athletes, as follows:

Speed: 5-meter sprint (s), 10-meter sprint (s), 30-meter sprint (s), 15-meter sprint (s), 15-meter high-speed sprint (s)

Strength: Standing long jump (cm), Triple jump (m), High jump (cm), 5 jumps with one foot (m), Weight squats (kg), Bench press (kg)

Endurance: 2000-meter run (s), Cooper test (m), Shuttle run test (s)

Speed Endurance: 5x30 meter shuttle run (s), 10/20/30-meter run with five times (s), 50-meter slow run and 50-meter sprint (s), 10x30m shuttle run (s), 400-meter run (s)

Agility: T-test (s), Hexagon jump (s), 5-meter cone drill (s), 2-meter shuttle run (s), 505 agility test (s)

Flexibility: Sit and reach test (cm), 1-minute sit-ups (reps), 1-minute back extensions (reps)

Interview with trainers

An interview questionnaire was delivered to twenty football coaches at sport training centers in Ho Chi Minh City, Long An Province, Dong Thap Province, Can Tho Province, and An Giang Province. These coaches have experience in training young football players, so they are eligible to select which fitness tests are most suitable for the 13-year-old talented footballers. The questionnaire aimed to explore how frequently each test should be used according to three levels (frequently, occasionally, and not at all).

Qualifications of the participating trainers are as follows

- Professional football training level: 1 person, accounting for 5% of participants
- Level A football training: 6 people, accounting for 30% of participants
- Level B football training: 6 people, accounting for 30% of participants
- Level C football training: 7 people, accounting for 35% of participants

Years of experience among the participating trainers are as follows

- Over 15 years: 5 trainers, accounting for 25%
- 10 to 15 years: 9 trainers, accounting for 45%
- 5 to 10 years: 4 trainers, accounting for 20%
- Under 5 years: 2 trainers, accounting for 10%

Table 1 presents the interview results.

Table 1: Survey results of the frequency of using the twenty-seven fitness tests towards 13-year-old talented football players in An Giang province

No.	Test	Frequency of Usage					
		Frequently		Occasionally		Not at all	
		SL	%	SL	%	SL	%
Speed							
1	5-meter sprint (s)	11	55	5	4	4	20
2	10-meter sprint (s)	13	65	6	30	1	5
3	30-meter sprint (s)	17	85	2	10	1	5
4	15-meter sprint (s)	18	90	2	10	0	0
5	15-meter high-speed sprint (s)	14	70	4	20	2	10
Speed endurance							
6	5x30 meter shuttle run (s)	18	90	1	5	1	5
7	10/20/30-meter run with five times (s)	7	35	7	35	6	30
8	50-meter slow run and 50-meter sprint (s)	5	25	7	35	8	40
9	10x30m shutllte run (s)	12	60	4	20	4	20
10	400-meter run (s)	10	50	5	25	5	5
Strength							
11	Standing long jump (cm)	18	90	0	0	2	10
12	Triple jump (m)	11	55	9	45	0	0
13	High jump (cm)	12	60	4	20	4	20
14	5 jumps with one foot (m)	7	35	8	40	5	25
15	Weight squats (kg)	5	25	5	25	10	50
16	Bench press (kg)	9	45	5	25	4	20
Endurance							
17	2000-meter run (s)	18	90	2	10	0	0
18	Cooper test (m)	14	70	1	5	11	55
19	Shuttle run test (s)	8	40	7	35	5	25
Agility							

20	T-test (s)	12	60	4	20	4	20
21	Hexagon jump (s)	10	50	5	25	5	25
22	5-meter cone drill (s)	7	35	7	35	6	30
23	2-meter shuttle run (s)	5	25	7	35	8	40
24	505 agility test (s)	19	95	1	5	0	0
Flexibility							
25	Sit and reach test (cm)	18	90	2	10	0	0
26	1-minute sit-ups (reps)	7	35	6	30	7	35
27	1-minute back extensions (reps)	8	40	1	5	1	5

The research achieved a 100% response rate, with 20 out of 20 distributed questionnaires returned. Seven fitness tests, which were frequently used by over 75% of the respondents, were selected for further analysis. The chosen tests were as follows:

- Speed: 30-meter sprint (s), 15-meter sprint (s)
- Strength: Standing long jump (cm)
- Endurance: 2000-meter run (s)
- Speed endurance: 5x30 meter shuttle run (s)
- Agility: 505 agility test (s)
- Flexibility: Sit and reach test (cm)

Reliability testing of the chosen tests

The reliability of a test is defined as the consistency of test results at different times in the same experimental conditions and participants [23, 24, 25]. It is necessary to measure the reliability of tests because even though measurement tools are strictly ensured, the test results can show some slight fluctuations. These fluctuations mainly stem from the changes in the state of the participants (fatigue, motivation, and focus), external conditions (temperature, wind, humidity, power supply, etc.), states of testers, and unexpected issues during the testing procedure. All of these factors are encompassed by the term *measurement errors.*

Twenty two male soccer players from An Giang province, aged 13, participated in the physical fitness assessment using the seven selected tests. Two rounds of testing were conducted, spaced three days apart, under the same conditions and procedure sequences. To assess test reliability, the study calculated the correlation coefficient (r) between the results of the first and second tests, with results presented in Table 2.

- If the correlation coefficient $r \geq 0.8$ and $p \leq 0.05$, then the test is considered reliable.
- If the correlation coefficient $r < 0.8$, then the test is considered not reliable.

Table 2: Reliability coefficients of physical fitness assessment tests of 13-year-old An Giang province male football athletes

No.	TEST	1st $\overline{X} \pm S$	2nd $\overline{X} \pm S$	r	P
1	30-meter sprint (s)	5.13 ± 0.24	4.84 ± 0.42	0.81	<0.01
2	15-meter sprint (s)	2.75 ± 0.12	2.73 ± 0.13	0.89	<0.01
3	5x30m shuttle run (s)	23.56 ± 0.31	23.46 ± 0.31	0.90	<0.01
4	Standing long jump (cm)	197.41 ± 18.22	199.45 ± 17.07	0.86	<0.01
5	2000-meter run (s)	482.64 ± 14.54	481.06 ± 14.57	0.98	<0.01
6	505 agility test (s)	2.70 ± 0.07	2.67 ± 0.06	0.86	<0.01
7	Sit and reach test (cm)	13.00 ± 3.36	13.19 ± 3.30	0.99	<0.01

Table 2 shows that all of the seven fitness tests have sufficient reliability ($r > 0.8$ and $P < 0.01$). As a result, it can be concluded that through the processes of literature review, interviews, and reliability testing, seven fitness tests were identified for evaluating male football players aged 13 in An Giang province. The tests are:

- Speed: 30-meter sprint (s), 15-meter sprint (s)
- Strength: Standing long jump (cm)
- Endurance: 2000-meter run (s)
- Speed endurance: 5x30 meter shuttle run (s)
- Agility: 505 agility test (s)
- Flexibility: Sit and reach test (cm)

Table 3: Results of the physical fitness between U13 An Giang province's and U13 PVF football athletes

No.	Test	U13 An Giang	U13 PVF	t	P
		$\overline{X} \pm SD$	$\overline{X} \pm SD$		
1	30-meter sprint (s)	5,13 ± 0,24	4,97±0,55	3,07	<0,05
2	15-meter sprint (s)	2,72 ± 0,10	2,70±0,32	0.93	>0,05
3	5x30 meter shuttle run (s)	23,56 ± 0,31	22,85±22,85	10,74	<0,05
4	Standing long jump (cm)	197,41±18,22	167,41±167,41	7,72	<0,05
5	2000-meter run (s)	481,06±14,57	474,22±474,22	2,20	<0,05
6	505 agility test (s)	2,70 ± 0,07	2,75±0.13	3,13	<0,05
7	Sit and reach test (cm)	13,19 ±3,30	12,27±2.48	1,30	>0,05

Note: n = 22 with degrees of freedom df = n - 1, t_{05} = 2,080

Assessment of the current physical strength of 13-year-old male athletes of the An Giang province's football team

The study conducted an assessment of the physical fitness status of 13-year-old male soccer players from An Giang province and compared it with that of the Promotion fund of

Vietnamese Football talents (PVF) [26]. The study utilized the T-test on the main subject to compare its mean score with the theoretical mean. In this case, the theoretical mean is the performance of PVF athletes.

If the difference between the mean values of the two subjects being compared is statistically significant ($t \geq t_{05} = 2.080$ or $p \leq 0.05$), a conclusion can be made regarding which group has better or worse physical fitness. If the mean values differ but the difference is not statistically significant ($t < t_{05} = 2.080$ or $p > 0.05$), the two groups' results are considered equivalent.

Table 3 shows the results.

Table 3 shows that the physical fitness of the 13-year-old male soccer players from An Giang province is superior to that of the U13 PVF players in the test of standing long jump (cm); equivalent in the tests of 15-meter sprint (s) and Sit and reach test (cm). However, they perform worse in the tests of 30-meter sprint (s), 5x30 meter shuttle run (s), 2000-meter run (s), and 505 agility test (s). Therefore, it can be seen that the U13 male soccer players from An Giang province exhibit better strength compared to the U13 PVF players. Their speed and flexibility are equivalent, while the An Giang team's endurance, speed endurance, and agility are inferior.

Conclusion

Through the steps of literature review, interviews, and reliability testing, the study identified seven fitness tests for evaluating 13-year-old male soccer players from An Giang province as follows:

- Speed: 30-meter sprint (s), 15-meter sprint (s)
- Strength: Standing long jump (cm)
- Endurance: 2000-meter run (s)
- Speed endurance: 5x30 meter shuttle run (s)
- Agility: 505 agility test (s)
- Flexibility: Sit and reach test (cm)

The physical fitness status of the 13-year-old male soccer players from An Giang province is better than that of the U13 PVF players in strength, specifically in the test of standing long jump. Both of them are equivalent in speed (15-meter sprint) and flexibility (Sit and reach test). However, U13 An Giang football players need to improve their speed (30-meter sprint), speed endurance (5x30 meter shuttle run), endurance (2000-meter run), and agility (505 agility test).

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