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The physical fitness status of male students at the university of Da Nang, Vietnam

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Abstract
Physical fitness is a key indicator of bodily quality and directly influences an individual's quality of life, especially in the case of university students who represent the nation's intellectual resources. This study aims to provide accurate, comprehensive, and scientifically grounded insights into the physical condition of male students at The University of da Nang. The research has employed various methods common in sports science, including document analysis, interviews, pedagogical testing, anthropometry, biomedical assessments, and statistical analysis, to select appropriate criteria for evaluating the students' physical fitness. The research subjects consisted of 1,915 second-year male students from The University of da Nang's member institutions, along with 12 experts, professionals, and experienced lecturers in the field of physical education. The study has identified eight key criteria for assessing the physical fitness of male students at The University of da Nang. Results showed that these students generally exhibited weaknesses in endurance and lower-body muscular strength, but demonstrated advantages in agility and speed. The average BMI was 20.12 kg/m², categorized as normal according to WHO standards, while the average cardiac functional index was 11.18 (HW), which falls into the poor category based on the Ruffier scale.

Keywords: Physical condition, male students, the university of Da Nang

Introduction

Physical education and sports are an integral part of social culture - a form of activity where the primary means are physical exercises (manifested through various forms of physical training) aimed at improving physical fitness, enhancing sports performance, enriching cultural life, and contributing to the well-rounded development of individuals [1, 2]. Affirming this view, on December 1, 2011, the Central Executive Committee of the 11th Party Congress issued Resolution No. 08/NQ-TW on strengthening the Party's leadership to promote physical education and sports by 2020. The resolution emphasizes: "School-based physical education and sports are an essential part of the broader sports movement and a key component of comprehensive student development, requiring appropriate investment and attention [4].

One of the key goals of school physical education and sports is to develop physical fitness [4]. According to Nguyen Toan and Pham Danh Ton, "Physical fitness refers to the bodily qualities of an individual. It comprises relatively stable morphological and functional characteristics formed through genetic inheritance and life conditions, including education and training." Physical fitness includes composition, strength, and adaptability [5]. Among these, physical strength (or motor fitness) is considered the core goal of physical education.

As participation in physical activities reflects the human desire to reach optimal physical performance, their potential is being harnessed to achieve the highest possible results in matches, especially competitive sports. Physical traits are considered distinct characteristics of motor skills and are typically divided into five basic components: speed, strength, endurance, coordination, and flexibility [6, 7]. Moreover, the development of physical attributes is closely linked to the formation of motor skills and the maturation of bodily systems and functions [1, 6]. As a result, developing these traits becomes a central focus of physical education, receiving significant attention from researchers, experts, and physical education teachers.

Physical fitness plays an essential role in human health and quality of life. A strong, healthy body serves as the foundation for effective learning, productive work, and a fulfilling life. Individuals with good physical health are better equipped to resist illness, maintain a positive mindset, and sustain high energy levels. To improve students' physical condition, appropriate methods are required that demand a clear understanding of their current physical fitness status. This serves as the basis for proposing feasible and targeted improvement strategies. In light of this importance, our research team decided to conduct a study and wrote it for the paper titled:

"The Physical Fitness Status of Male Students at The University of da Nang, Vietnam."

The purpose of this study is to identify and provide accurate, evidence-based insights into the current physical fitness status of male students at The University of da Nang, Vietnam.

Materials & methods

1. Participants

- Participants in physical fitness assessments: 1,915 second-year male students from the member

universities of The University of Da Nang (University of Science and Technology, University of Economics, University of Education, University of Foreign Languages, University of Technical Education, and the Vietnam-Korea University of Information and Communication Technology; they were selected through a combination of random and convenience sampling methods to ensure a broad and representative sample.

- Participants for evaluating the reliability of fitness assessment criteria: 300 male students who were chosen by random and convenience sampling from three-member universities of The University of da Nang - 100 students each from the University of Science and Technology, the University of Economics, and the University of Education; these students were also selected using random and convenience sampling methods.
- Participants for expert interviews to select fitness assessment criteria: 12 experts, including national-level specialists in physical education and administrative staff from member universities of The University of da Nang; these individuals were selected through purposive sampling based on their professional experience and expertise.

2. Methodology

The study employed the following methods.

- Document analysis and synthesis: This method was used to review and synthesize information from a variety of sources in order to form the theoretical foundation for the study, guide the selection of research methods, and support the selection of criteria and the interpretation of research findings.
- Questionnaire-based interviews: This method involved gathering expert opinions from specialists, professionals, and lecturers in the field of physical education to assist in selecting suitable physical fitness assessment criteria for the target population.
- Pedagogical testing: This method was used to assess the physical fitness of participants through the following tests: 30-meter sprint (seconds), standing broad jump (cm), 4 x 10-meter shuttle run (seconds), 5-minute self-paced run (meters), and sit-and-reach flexibility test (cm).

Medical Examination Method

- Anthropometric Measurements: This method focused on measuring the morphological characteristics of the body, including height (cm), weight (kg), and Body Mass Index (BMI, kg/m²), providing insight into the physical structure and development of the students.
- Biomedical Testing: This method was used to evaluate participants' physiological functioning, particularly cardiovascular health. In this study, the Ruffier test was used to assess cardiac function.
- Statistical Analysis: All collected data were processed and analyzed using statistical methods with the support of SPSS 22.0 software, ensuring accuracy and scientific rigor in the interpretation of results.

Results and Discussion

1. Determining the criteria for assessing the physical condition of male students of The University of da Nang.

The study was conducted in 03 steps.

Step 1: Synthesize the physical evaluation criteria for students from the research works of domestic and foreign authors such as Duong Nghiep Chi *et al* (2013) [8], Ministry of Education and Training (2008) [9], Nguyen Ngoc Minh (2018) [10], Dang Minh Thang (2019) [11], Nguyen Quang San (2020) [12],Dao Chanh Thuc (2020) [13], Nguyen Huu Tri (2023) [14], Mai Van Ngoan (2025) [15]. Based on the synthesis and analysis of relevant documents, and taking into consideration the research objectives, the practical conditions at The University of da Nang, as well as the researcher's own professional experience, the study identified a set of physical fitness assessment criteria for male students at The University of da Nang. These criteria include height (cm), weight (kg), BMI (kg/m^2), Quetelet index (g/cm), cardiac function (HW), 30-meter sprint (seconds), standing broad jump (cm), 4 x 10-meter shuttle run (seconds), 5-minute self-paced run (meters) và sit-and-reach flexibility test (cm).

Step 2: Surveys with physical education experts and administrators

In this step, a questionnaire was developed and administered to 12 experienced individuals, including university administrators, specialists, and lecturers in the field of physical education, to gather their opinions on the proposed criteria for assessing students' physical fitness. Each expert participated in two rounds of interviews to verify the consistency of their responses. The degree of agreement between the two rounds was analyzed using the chi-square (χ^2) test. The results of this consistency check are presented in Table 1.

Table 1: Survey results about the determination of physical assessment criteria for male students of The University of Da Nang

	Criteria	1st (n = 12)		2nd (n = 12)		Results	
		Total	%	Total	%	χ^2	Sig
1	Height (cm)	52	86.67	51	85.00	0.11	0.735
2	Weight (kg)	43	71.67	43	71.67	0.00	1.000
3	BMI (kg/m^2)	52	86.67	51	85.00	0.11	0.735
4	Quetelet (g/cm)	44	73.33	44	73.33	0.00	1.000
5	Cardiac function (HW)	56	93.33	55	91.67	0.20	0.655
6	30-meter sprint (seconds)	58	96.67	58	96.67	0.00	1.000

7	Standing broad jump (cm)	55	91.67	56	93.33	0.20	0.655
8	4 x 10-meter shuttle run (seconds)	53	88.33	53	88.33	0.00	1.000
9	Sit-and-reach flexibility test (cm)	51	85.00	52	86.67	0.11	0.735
10	5-minute self-paced run (meters)	56	93.33	56	93.33	0.00	1.000

Results from Table 1 indicate that, across both rounds of interviews, all assessment criteria showed χ^2 values less than the critical value ($\chi^2 = 3.84$) and significance levels (Sig.) greater than 0.05. This means that there was no statistically significant difference between the observed values in the two rounds at the 5% level. Therefore, the responses from experts, specialists, and administrators demonstrated a high level of consistency. Based on the interview results, the criteria selected were those with total scores exceeding 75% of the maximum score in both rounds (> 45 points). Following this principle, the study selected the following physical fitness assessment criteria: Height (cm), BMI (kg/m^2), cardiac function (HW), 30-meter sprint (seconds), standing broad jump (cm), 4 x 10-meter shuttle run (seconds), 5-minute self-paced run (meters) và sit-and-reach flexibility test (cm).

Step 3: Check the reliability of the criteria

For the criteria used to evaluate morphology and function - height (cm), BMI (kg/m²), and cardiac function (HW) - the study did not retest reliability, as these measures are widely applied across populations and are typically obtained using modern, precise equipment, making them inherently reliable.

To assess the reliability of the performance-based fitness tests, the study followed the Pre-Test method by Nghiep Chi (2004) [16], Le Van Lam & Pham Xuan Thanh (2007) [17], and Do Vinh & Trinh Huu Loc (2010) [18]. Two rounds of testing were conducted with the same sample group, spaced five days apart, under consistent testing conditions. The correlation coefficients (r) between the first and second tests were then calculated to determine reliability. The results are presented in Table 2.

Table 2: Reliability coefficient of physical fitness evaluation criteria of male students in The University of Da Nang (n = 300)

	Criteria	1st		2nd		Reliability coefficient	
		$\overline{X}$	S	$\overline{X}$	S	r	Sig
1	30-meter sprint (seconds)	218.96	19.85	218.90	20.39	0.99	<0.01
2	Standing broad jump (cm)	4.68	0.41	4.68	0.41	0.97	<0.01
3	4 x 10-meter shuttle run (seconds)	10.69	1.13	10.67	1.13	0.98	<0.01
4	5-minute self-paced run (meters)	978.03	113.20	981.37	114.20	0.96	<0.01
5	Sit-and-reach flexibility test (cm)	14.54	3.03	14.58	2.97	0.98	<0.01

The data in Table 2 shows that all of the criteria have a reliability coefficient of r > 0.8 and sig < 0.01, which means that they are all reliable enough to evaluate the physical condition of the research subject.

2. Assessment of the current physical fitness of male students of The University of da Nang

After determining the criteria, the study conducted a test of the physical fitness with 1915 male students of The University of da Nang, and then calculated the parameters. $\overline{X}$, S, C_V, ε . This obtained the results in Table 3

Table 3: Physical condition of male students of The University of da Nang (n = 1915)

	Criteria	$\overline{X}$	S	C_V	ε
1	Height (cm)	168.25	4.31	2.56	0.00
2	BMI (kg/m^2)	20.12	1.96	9.75	0.00
3	Cardiac function (HW)	11.18	2.37	21.18	0.01
4	30-meter sprint (seconds)	4.74	0.41	8.55	0.00
5	Standing broad jump (cm)	220.15	19.76	8.98	0.00
6	4 x 10-meter shuttle run (seconds)	10.25	1.07	10.47	0.00
7	5-minute self-paced run (meters)	971.39	107.60	11.08	0.00
8	Sit-and-reach flexibility test (cm)	15.35	3.31	21.56	0.01

The data presented in Table 3 show that the coefficient of variation (CV) - a statistical parameter reflecting the degree of variability among individuals in a sample or population - indicates a high level of consistency (i.e., low dispersion) across several indicators for the study participants. Specifically, the variables that have CV values below 10% are Height (cm), BMI (kg/m²), 30-meter sprint (seconds), and Standing broad jump (cm), demonstrating a high degree of homogeneity among individuals. These indicators are consistently stable due to minimal influence from environmental or lifestyle factors (e.g., nutrition, daily routines) and are typically measured using ratio scales, which possess an absolute zero, ensuring precise and reliable data collection.

Indicators with moderate consistency (CV between 10% and 20%) include a 5-minute self-paced run (meters) and a 4 x 10-meter shuttle run (seconds).

Indicators that showed lower consistency (CV > 20%) are Sit-and-reach flexibility test (cm) and Cardiac function (HW).

Despite the relatively higher variability in some indicators, all sample means exhibited sufficient representativeness ($\varepsilon < 0.05$), ensuring the reliability of the subsequent analyses and interpretations.

The average BMI of male students at The University of da Nang is 20.12 kg/m², which falls into the normal range according to the World Health Organization (WHO) classification. However, their average cardiac function index is 11.18 HW, which is categorized as weak according to the Ruffier test standards.

The study evaluated both individual and overall physical fitness levels of the participants based on Decision No. 53/2008/QĐ-BGDĐT, using four key criteria, namely Standing broad jump (strength), 30-meter sprint (speed), 4 x 10-meter shuttle run (agility), and 5-minute self-paced run (endurance).

The results of the physical fitness assessment for 19-year-old male students at The University of da Nang participating in extracurricular sports clubs, as per Decision 53/2008/QĐ-BGDĐT, are summarized in Table 4.

Table 4: Assessment of the physical fitness of a 19-year-old male student of The University of Da Nang according to Regulation 53/2008/QĐ-BGDĐT (n = 1915)

		30-meter sprint (seconds)	Standing broad jump (cm)	4x10m shuttle run (seconds)	5-minute self-paced run (meters)	Students' fitness
Standards of The Ministry of Education	Good	< 4,70	> 225	< 11,75	> 1060	
	Passed	≤ 5,70	≥ 207	≤ 12,40	≥ 950	
Male students of The University of da Nang	Good	706 students 38.87%	780 students 40.73%	1817 students 94.88%	344 students 17.96%	246 students 12.85%
	Passed	1209 students 63.13%	583 students 30.44%	98 students 5.12%	916 students 47.83%	856 students 44.70%
	Unpassed	0 students 0.0%	552 students 28.83%	00 students 0.0%	655 students 34.20%	813 students 42.45%

The data presented in Table 4 illustrates the current state of physical fitness of 19-year-old male students at The University of Da Nang, compared to the standards outlined in Decision No. 53/2008/QĐ-BGD&ĐT. The findings show that 246 students (12.85%) are rated as "Good," 856 students (44.70%) meet the "Satisfactory" level, while 1102 students (57.55%) fail to meet the required physical fitness standards.

Among the individual fitness components, the 5-minute self-paced run, which evaluates cardiovascular endurance, has the highest failure rate, with nearly 35% of students (655 individuals) not achieving the required result. In contrast, the 30-meter sprint, which measures speed, records the highest success rate, with over 63.13% (1209 students) meeting the standard. When analyzing the proportion of students rated as "Good," the 4 x 10-meter shuttle run (agility) shows the highest percentage, with more than 95% (1817 students) achieving this level. On the other hand, the 5-minute run has the lowest number of students classified as "Good," with only 12.85% (246 students) reaching this level.

These results indicate that 19-year-old male students at The University of Da Nang tend to show weaknesses in endurance and lower-body muscular strength, while performing better in areas related to agility and speed.

Conclusion

The study has identified eight key physical fitness assessment criteria for male students at The University of Da Nang. Those criteria include height (cm), BMI (kg/m²), cardiac function (HW), 30-meter sprint (seconds), standing broad jump (cm), 4 x 10-meter shuttle run (seconds), 5-minute self-paced run (meters), and the sit-and-reach flexibility test (cm).

The overall physical condition of the students highlights a lack of endurance and leg strength but indicates strengths in agility and speed. The average BMI of the students was 20.12 kg/m², which falls within the "normal" range according to WHO standards. However, their average cardiac function index is 11.18 HW, which is rated as "poor" under the Ruffier classification. These results emphasize the need for targeted interventions to improve cardiovascular fitness and muscular endurance among this student population.

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