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THE EFFECT OF WEIGHT REDUCTION ON THE PHYSICAL FITNESS OF MALE MARTIAL ARTS ATHLETES IN THE TRADITIONAL MARTIAL ARTS TEAM OF CA MAU PROVINCE, VIETNAM

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Abstract:
The study was undertaken to assess the effect of weight reduction on the physical fitness of male traditional martial arts athletes from Ca Mau province, Vietnam, during the preparation phase for competition. The study monitored ten male traditional martial arts athletes from Ca Mau province, Vietnam, during a 15-day weight reduction period prior to competition. The research methodologies employed encompass document analysis and synthesis, interviews, biomedical techniques, pedagogical assessments, and statistical mathematics. The study results demonstrate that after a 15-day weight loss period, the athletes' body mass significantly decreased ($P \leq 0.05$), while the reduction in body fat percentage was not statistically significant. The process of losing weight causes mild depletion, which can have an effect on the athlete's body functions and overall fitness. The outcomes of all physical fitness assessments following weight loss were inferior to those conducted prior to weight loss, and this difference was statistically significant ($p < 0.05$). The research findings offer a scientific foundation for the selection and implementation of suitable weight loss strategies, with the goal of minimizing adverse effects on physical fitness and enhancing the competitive performance of traditional martial arts athletes.

Keywords: traditional martial arts, weight reduction, physical conditioning, athletes, Vietnam

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1. Introduction

Vietnamese traditional martial arts are a national martial arts heritage, formed and developed over centuries, closely linked to the history of nation-building and defense. They are expressed through forms, weapons, and practical combat techniques with high applicability and feature many regional martial arts (North, Central, and South), reflecting the Vietnamese spirit, philosophy, and identity. Historical values, customs, geography, and national consciousness form the foundation of Vietnamese national culture, which includes martial arts and martial philosophy. Vietnamese martial arts and martial philosophy have formed the philosophy of life "Humanity and Martial Spirit," which serves as a guiding principle for our nation's longevity and development (Hòa, L. K., 2016) [1], [2].

Traditional martial arts constitute an individual sport characterized by direct competition and intense physical contact between two opponents. Therefore, traditional martial arts demand the following attributes: strength, speed, endurance, agility, dexterity, flexibility, and mobility. Athletes engage their entire body, necessitating robust, dexterous, and flexible hands and feet, along with optimal physical fitness (Hoa

Ngoc Thang et al., 2016; Dang Minh Thanh et al., 2024) [3], [4].

In combat sports, which are classified by weight categories, athletes are divided into weight divisions to compete against one another based on their body mass. Weight classes are designated to promote greater competitive balance and to reduce hazards associated with disparities in body mass, size, strength, and endurance (Franchini et al., 2012; Matthews et al., 2019; Seyhan, 2018) [5], [6], [7]. In practice, athletes frequently compete in weight categories below their natural body weight to secure a competitive edge (Brechney et al., 2022) [8]. Barley and colleagues (2019) [9] noted that athletes participating in combat sports often employ rapid weight reduction techniques to contend at reduced body weights. To accomplish the aforementioned objective, athletes rapidly reduce their weight before the official weigh-in, according to their registered weight category, and subsequently undergo a rehydration and carbohydrate replenishment phase (Martínez-Aranda et al., 2023) [10].

Significant weight loss rates have been documented among numerous combat sports athletes, including professional and amateur MMA practitioners (97%) (Connor and Egan, 2019), elite kickboxers (100%) (Dugonjić et al., 2019) [11], senior athletes, amateur boxers (95%) (Reale et al., 2018a), and Judo competitors (100%) (Kons et al., 2017) [12]. Athletes are reported to undertake rapid weight loss practices aimed at decreasing glycogen stores, intestinal food volume, and body fluids through methods such as fasting, exercising in heated environments, wearing rubber protective gear, consuming ample water, restricting fluid intake, and exposing themselves to hot water and saunas (Connor and Egan, 2019; Martínez-Aranda et al., 2023) [10], [13].

Studies on rapid weight loss show that 60-97% of martial arts athletes engage in rapid weight loss (Connor & Egan, 2019; Ranisavljev et al., 2022) [13], [14]. Dehydration, excessive sweating, and severe calorie restriction are all common methods. Wrestlers,

MMA fighters, and grapplers lose the most weight. A systematic review by Mauricio et al. (2022) [15] showed that rapid weight loss of up to 5% did not significantly impair short-term strength and physical fitness. However, the studies by Fernández-Elías et al., 2014 [16], on endurance sports, show that dehydration reduces aerobic performance. Regarding health risks, particularly kidney function, Trivic et al. (2023) [17] found a significant increase in kidney stress indicators in wrestlers using rapid weight loss, raising concerns about acute kidney injury as it increases creatinine, blood urea nitrogen, and urine specific gravity, indicating kidney stress and dehydration, while Maksimovic et al. (2024) [18] linked rapid weight loss to a higher incidence of metabolic syndrome in retired martial arts athletes. Regarding psychological impact, many athletes experience increased anxiety, mood swings, and cognitive decline due to rapid weight loss, as discovered by Janiszewska & Przybyłowicz (2020) []. Additionally, coaches and teammates are the most influential figures in rapid weight loss strategies, while nutritionists and medical professionals play a minimal role (Connor & Egan, 2019; Ranisavljev et al., 2022) [13], [14].

According to research by Paul Campbell et al., 2026 [19], a comparison of rapid weight loss methods among martial arts athletes (n = 35, male n = 30, female n = 5) from the United Kingdom was conducted, measuring results before and within 24 hours (< 24 hours) compared to those measured after 24 hours (≥ 24 hours). The results indicated that the '≥ 24 hours' group had a significantly higher percentage of body mass loss before and after competition ($p < 0.01$) compared to the '< 24 hours' group, both in terms of normal body mass loss (9.7% compared to 5.2%) and post-competition body mass gain (13.0% compared to 8.7%), (9.4% compared to 3.9%).

Gradual weight loss is recommended as the preferred method for reducing body fat, minimizing muscle atrophy, and reducing prolonged dehydration (Franchini et al., 2012) [5]. However, the majority of combat athletes lose a significant amount of body mass in a short period before weigh-in (~2 weeks), which is known as "weight cutting" (Lakicevic et al., 2021) [20]. Additionally, the majority of martial arts athletes will employ methods to initiate rapid weight loss, described as a 2–10% reduction in body mass, typically within 2–3 days of pre-competition weigh-in, followed by rapid weight gain (Artioli et al., 2016; Lakicevic et al., 2021) [20], [21]. Dehydration, excessive physical exercise, calorie-restricted diets, and saunas are common methods. Although some athletes effectively rehydrated and returned to their initial body weight before the match, research by Trivic et al. (2023) [17] has shown that excessive rapid weight loss negatively impacts endurance, strength, cognitive function, and long-term health.

Furthermore, although Mauricio et al. (2022) [15] observed that losing up to 5% of body weight does not substantially impair strength and fitness, there is no available data regarding the cumulative effects of multiple weight loss cycles over an athlete's career. Psychological factors also play a significant role in sustaining weight loss behavior. Some athletes associate weight loss with discipline and mental resilience (Janiszewska & Przybyłowicz, 2020) [22], which can further perpetuate undesirable behaviors. Such cultural norms must be reformed through education and regulation. Policy reforms

should aim to diminish the reliance on extreme weight loss techniques. A body water-based weighing method, adopted by certain combat sports organizations, can help mitigate extreme dehydration practices. Coaches and sports personnel also require enhanced training in nutrition and weight management strategies (Ranisavljev et al., 2022) [14]. Enhanced regulations, in conjunction with targeted educational initiatives, may guide focus toward safer weight management practices while maintaining equitable competition.

The study by Karn Jariya M. Amad in 2025 [23] emphasizes the prevalence and associated risks of rapid weight loss (RWL); however, many athletes continue to engage in these practices despite the acknowledged dangers. Instructors and athletes often prioritize short-term competitive advantages over long-term health implications, which contributes to the issue. This methodology is problematic because studies (Maksimovic et al., 2024; Trivic et al., 2023) [18], [17] have unequivocally shown that repeated rapid weight loss is linked to metabolic and renal disorders. Physiologically, extreme methods of rapid weight loss, such as acute dehydration and caloric restriction, can pose significant health risks. Athletes may regain weight following reweighing; however, physiological indicators such as kidney stress markers (Trivic et al., 2023) [17] demonstrate that these practices are detrimental, even if external performance appears unaffected.

Currently, it is well understood that numerous weight loss methods exist; however, which approach is biologically appropriate, effective, and does not compromise overall or targeted physical fitness remains a pertinent question. That's also a question for coaches and experts in general. Considering the aforementioned issues, it is essential to investigate the effects of weight loss techniques on the physical endurance of traditional martial arts athletes, as this research holds scientific importance and practical significance. The research findings not only enhance the theoretical foundation for the physical training of traditional martial arts. This study aims to not only provide athletes with evidence-based weight management strategies but also to establish a scientific foundation for coaches and athletes to select and apply appropriate methods that minimize negative impacts on physical fitness and improve competitive performance. Considering its significance, I opted to undertake a study entitled: *"The effect of weight reduction on the physical fitness of male martial arts athletes in the traditional martial arts team of Ca Mau province, Vietnam"*.

2. Methodology

2.1 Research Participants

Ten male athletes from the Traditional Martial Arts team in Ca Mau province are currently training for the national competition in 2025. The athletes possess comparatively uniform skill levels, engage in consistent training, and adhere to the weight loss program established by the coaching staff.

Thirty experts and coaches were consulted to garner insights regarding the current state of weight loss, widely adopted weight reduction methods, and the impact of the weight loss process on the physical fitness of traditional martial arts athletes.

2.2 Research Methods

Method of document analysis and synthesis: Gather and examine domestic and international literature concerning weight management, physical fitness, and the physiological attributes of athletes in combat sports to serve as the theoretical foundation for the study.

2.2.1 Interview Method

Conduct interviews with 30 experts and instructors to collect insights regarding the current landscape of weight loss, prevalent weight loss techniques, and the impact of the weight loss process on the physical fitness of traditional martial arts athletes.

2.2.2 Biomedical Methods

Assess indicators concerning body mass, body fat percentage, and hydration status of athletes during weight loss through weight measurements, fluid loss during training, and pertinent physiological parameters. The weight reduction investigation was carried out over a period of 15 days before the competition at the training center of the Ca Mau Provincial Traditional Martial Arts Team, encompassing the following parameters:

Calculate the amount of water lost from the body. Anh, L. T., & Phú, L. V. (2009) [24]. To measure water loss through perspiration and respiration, the study was conducted as follows:

- Measure body weight before commencing (Pr).
- Measure body weight after physical activity to determine the variation in weight (Pe).
- Determine the volume of water consumed by the experimental subject during physical activity (D).
- The goal was to exclude water lost through excretion and to solely account for water loss via perspiration and respiration. I measured the subjects' weights immediately after exercise and before they urinated.
- The volume of water lost through sweat and breath is calculated using the formula:

$$SW\ (ml) = (Pr - Pe) \times 1200 + D$$

The formula includes:

- SW: The amount of water lost through perspiration and respiration (unit of measurement: milliliters).
- Pr: The initial body weight was measured before the commencement (unit of measurement: kilograms).

- Pe: Body weight after exercise (unit of measurement: kilograms).
- 1200 is the coefficient of water loss from the body (for every 1 kg of weight loss, it is equivalent to 1200 ml of water lost from the body).
- D: The quantity of water consumed by the experimental subject during exercise (unit of measurement: milliliters).
- The rate of water loss, calculated using the following formula:

$$Rate\ of\ dehydration\ (\frac{ml}{hour}) = \frac{amount\ of\ water\ lost\ (ml)}{training\ time\ (giờ)}$$

- The degree of dehydration, calculated using the following formula:

$$Level\ of\ dehydration\ (\%) = \frac{(Pr\ Pr\ -\ Pe)}{Pr}\ \times\ 100$$

Table 1: Table of functional effects due to dehydration

	Level of dehydration	**Functional impact**
1	2%	Thirst, skin not adapting, poor appetite, and infrequent urination.
2	4%	Reduced motor capacity by 20-30%, increased sensory maladaptation.
3	6%	The whole body feels weak, with no urination.
4	Above 8%	The pulse and body temperature increase, blood pressure drops, and circulation weakens, leading to death.

Note: Method for calculating fat mass (absolute fat): Hiệp, L. Q., & Uyên, P. T. (2003) [25],[26].

The method is based on the Sloan formula.

First, determine the anterior thigh skinfold (quadriceps muscle), shoulder blade skinfold (mm), and body weight (kg). Formula:

Body density = 1.1043 – (0.001327 * anterior thigh crease) – (0.00131 * fat folds in the hollow of the shoulder)

Fat mass % (Fat%) = (4.570/ D_B) – 1,142

Fat mass = Weight * Fat%

Pedagogical testing methods: Conduct physical fitness tests for athletes using a system of tests to assess strength, speed strength, speed, and endurance, suitable for the characteristics of traditional martial arts competition, including tests based on Hoa Ngoc Thang's 2007 study [27], which include the following tests: Back strength (kg), grip strength (kg), standing long jump (m), vertical jump in place (m), push-ups (times), punching the sandbag for 15 seconds (times), kicking the sandbag for 15 seconds (times), running 30 m (s), 10 m shuttle run (s), Cooper test (m).

Pedagogical surveillance method: Monitoring the training process, weight reduction, and physical performance of athletes throughout the research phase to enhance the analysis and assessment of outcomes.

2.2.3 Statistical Mathematical Methods

Descriptive statistical parameters, including mean (X), standard deviation (S), coefficient of variation (Cv%), and t-test, were employed to assess the differences before and after weight loss, with a significance level set at P = 0.05.

3. Results

3.1 The Physical Fitness Status of Male Traditional Martial Arts Athletes from Ca Mau Province, Vietnam, Before Weight Loss

The research team administered tests to evaluate the physical fitness of male traditional martial arts athletes in Ca Mau province, Vietnam, prior to weight loss, focusing on specific elements of physical fitness: strength, speed-strength, speed, and endurance. Determine the characteristic parameters of the sample; Table 1 details the findings.

Table 1: Summary of physical fitness test results for research subjects before weight loss (n = 10)

Content		$\underline{X}$	± S	**Cv%**	**Max**	**Min**
Strength	Back strength (kg)	135.7	4.64	3.42	141	128
	Grip strength (kg)	52.3	2.36	4.5	55	49
	Standing long jump (m)	2.21	0.15	6.99	2.5	2.01
	Vertical jump in place (m)	0.63	0.11	16.86	0.82	0.5
	Push-ups (times)	51.1	4.43	8.67	59	45
Speed-strength	Punching the sandbag for 15 seconds (times)	61.9	2.88	4.66	67	57
	Kicking the sandbag for 15 seconds (times)	54.2	2.1	3.87	57	50
Speed	Running 30 m (s)	4.48	0.1	2.31	4.6	4.3
	10 m shuttle run (s)	4.57	1.19	4.13	4.9	4.3
Endurances	Cooper test (m)	3445	136.32	3.96	3650	3200

The research results show:

- **Strength**: The mean values for strength indicators, including back strength, hand grasp strength, standing long jump, standing high jump, and push-ups in the prone position, among male traditional martial arts athletes from Ca Mau province, were at a commendable level. The coefficient of variation (Cv%) for all indicators is below 10%, signifying a relatively consistent distribution of strength qualities within the athlete group.
- **Speed-strength:** The outcomes of the 15-second striking and kicking bag test indicate that the athlete possesses a strong and rapid force production capability, aligning well with the demands of traditional martial arts competitions. The coefficients of variation for these indicators are all below 10%, indicating the stability of speed and strength within the study group.

- **Speed:** The 30-meter sprint time with a high start and the 10-meter shuttle run of the male martial arts athletes from Ca Mau province were classified as excellent, with a low coefficient of variation (Cv% < 10%), demonstrating that the athletes' speed and ability to change direction were comparatively consistent.
- **Endurance:** The results of the Cooper test indicate that the physical performance capacity of male traditional martial arts athletes from Ca Mau province is at a commendable level. A coefficient of variation below 10% signifies a high level of consistency in the endurance performance of the athlete group.

Overall, prior to the weight loss phase, male traditional martial arts athletes from Ca Mau province exhibited a relatively high and stable level of physical fitness, providing a favorable basis for assessing the effects of the weight loss process on their physical conditioning.

3.2 The Changes in Body Mass, Fat Percentage, and Water Loss of Male Traditional Martial Arts Athletes from Ca Mau Province, Vietnam, After 15 Days of Weight Loss

Table 2 presents the results of the assessment of changes in body mass and fat percentage for male traditional martial arts athletes from Ca Mau province before and after 15 days of weight loss.

Table 2: Variations in body mass and body fat percentage of the study participants following 15 days of weight reduction (n = 10)

TT	Body weight before 15 days of weight loss (kg)	Body weight after 15 days of weight loss (kg)	Percentage of body fat (Fat%) before weight loss	Percentage of body fat (Fat%) after weight loss
	weight (kg): n = 10, $t_{0.05}$ = 2.228, P ≤ 0.05			
	$\underline{X}$**1 ± S**	$\underline{X}$*2* **± S**	$\underline{X}$ *1* **± S**	$\underline{X}$*2* **± S**
	63.53 ± 10.39	60.46 ± 10.35	3.067 ± 0.19	3.065 ± 0.2
W%	4.95%		0.065	
t	19.3		0	

The results in Table 2 show:

The mean body mass of the athletes declined from 63.53 ± 10.39 kg to 60.46 ± 10.35 kg, representing a growth rate of 4.95%. The t-test results indicated a statistically significant decrease in body weight at a significance level of P ≤ 0.05.

The body fat percentage (Fat%) of male traditional martial arts athletes from Bac Lieu province, measured 15 days before weight loss, was 3.067 ± 0.19 (%). The mean body fat percentage (Fat%) of male traditional martial arts athletes from Bac Lieu province after 15 days of weight reduction is 3.065 ± 0.2 (%). The growth rate is -0.065%, but this variation is not statistically significant (P > 0.05).

The findings indicated that the 15-day pre-competition weight reduction protocol predominantly facilitated athletes in decreasing body mass through a reduction in overall weight, with no significant alteration observed in body fat percentage.

The findings of the evaluation of the male Bac Lieu traditional martial arts athlete's body water loss status over the 15-day weight reduction period are summarized in Table 3.

Table 3: Summary of research results on dehydration status during 15 days of weight loss in the study subjects

Weight before exercise (kg)		**Weight after exercise (kg)**		**Drinking water (ml)**		**Sweat and breath (ml)**		**Urine (ml)**	
$\underline{X}$	δ	$\underline{X}$	δ	$\underline{X}$	δ	$\underline{X}$	δ	$\underline{X}$	δ
62.21	0.184	60.97	0.178	394.1	16.29	1763.4	107.8	83.4	1.73

The results in Table 3 show:

With a training session duration of 120 minutes, the male traditional martial arts athletes from Bạc Liêu province's team exhibit an average dehydration rate of:

$$Rate\ of\ dehydration = \frac{Amount\ of\ water\ lost\ (ml)}{Training\ time\ (giờ)}$$

$$= \frac{1763.4 + 83.4}{2} = 923.4\ (\frac{ml}{hour})$$

The average level of dehydration is:

$$Level\ of\ dehydration(\%) = \frac{(Pr\ Pr\ -\ Pe)}{Pr}\ X\ 100$$

$$= \frac{(62.21 - 60.97)\ X\ 100}{62.21} = 2\%$$

The average level of depletion among traditional martial arts athletes in Bac Lieu province during the 15-day weight reduction period is 2%.

3.3 Assess the Alterations in the Physical Endurance of Male Traditional Martial Arts Athletes from Ca Mau Province, Vietnam, in 2024, Following a Weight Loss Intervention

The results comparing the variations in physical fitness of male traditional martial arts athletes from Ca Mau province, Vietnam, in 2024, before and after the weight loss intervention are displayed in Table 4.

Table 4: Compare the changes in physical fitness of male traditional martial arts athletes from Ca Mau province, Vietnam, in 2024, before and after implementing weight loss

		Before weight loss	After weight loss	W%	$\|t_{tính}\|$	P
		$\underline{X}$	$\underline{X}$			
Strength	Back strength (kg)	135.7	132.4	- 2.61	7.33	P< 0.05
	Grip strength (kg)	52.3	49.9	- 4.70	7.86	P< 0.05
	Standing long jump (m)	2.296	2.085	- 9.63	5.62	P< 0.05
	Vertical jump in place (m)	0.631	0.555	- 12.82	11.95	P< 0.05
	Push-ups (lần)	51.1	47.4	- 7.51	5.06	P< 0.05
Speed-strength	Punching the sandbag for 15 seconds (times)	61.9	58.8	- 5.14	11.20	P< 0.05
	Kicking the sandbag for 15 seconds (times)	54.2	50.3	- 7.46	12.40	P< 0.05
Speed	30-meter run (s)	4.48	4.7	4.79	- 16.5	P < 0.05
	10-meter shuttle run (s)	4.53	4.76	4.95	- 6.17	P < 0.05
Sức bền	Cooper test (m)	3315	2875	-14.22	2.98	P < 0.05

The data in Table 4 show that the performance on all physical fitness tests after weight loss was lower than before weight loss, and this difference was statistically significant ($p<0.05$). Specifically, as follows:

3.3.1 Strength

The mean back strength measurement of male traditional martial arts athletes from Bac Lieu province was 135.7 kg in the first assessment and 132.4 kg in the second assessment.

The growth rate is -2.61%, with an absolute $t = 7.33 > t_{05} = 2.228$. This amount indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The result indicates that the back strength of male athletes practicing traditional martial arts in Bac Lieu province generally diminishes following the implementation of the weight loss method.

- The mean handgrip strength of male traditional martial arts athletes from Bac Lieu province was 52.3 kg in the initial test and decreased to 49.9 kg in the subsequent test. The growth rate is -4.70%, with an absolute $t = 7.86 > t_{05} = 2.228$. This result indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The outcome suggests that the handgrip strength of athletes practicing traditional martial arts in Bac Lieu province tends to diminish after the adoption of the weight reduction technique.
- The mean standing long jump distance for the traditional martial arts athlete from Bac Lieu province was 2.296 meters in the initial test and 2.085 meters in the subsequent test. The growth rate is -9.63%, with an absolute $t = 5.62 > t_{05} = 2.228$. This indicates statistically significant growth at a probability threshold of $P \leq 0.05$.

This result suggests that the standing long jump performance of the traditional martial arts athlete from Bac Lieu province tends to decline following the implementation of the weight loss method.

- The average standing high jump measurement of the Bac Lieu province's traditional martial arts athlete was 0.63 meters in the first test and 0.555 meters in the second test. The growth rate is -12.82, with an absolute $t = 11.95 > t_{05} = 2.228$. The result indicates statistically significant growth at a probability threshold of $P \leq 0.05$. This data indicates that the vertical standing leap of the male traditional martial arts athlete from Bac Lieu province generally declines following the implementation of the weight loss method.
- The average value of the push-up test for male athletes practicing traditional martial arts in Bac Lieu province was 51.1 in the first test and 47.4 in the second test. The growth rate is -7.51, with an absolute $t = 5.06 > t_{05} = 2.228$. This figure indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The result indicates that the number of push-ups conducted by male traditional martial arts athletes from Bac Lieu province decreases following the implementation of the weight loss method.

3.3.2 Speed-strength

- The average number of strikes against the sandbag within 15 seconds by the male traditional martial arts athlete from Bac Lieu province was 61.9 in the initial test and 58.8 in the subsequent test. The growth rate is -5.14%, with an absolute $t = 11.2 > t_{05} = 2.228$. This indicates statistically significant growth at a probability threshold of $P \leq 0.05$. This indicates that the 15-second sandbag striking performance of the traditional martial arts athlete from Bac Lieu province tends to decline following the implementation of the weight loss method.
- The mean number of repetitions for the 15-second kicks into a sandbag by the male traditional martial arts athletes from Bac Lieu province was 54.2 in the initial test and 50.3 in the subsequent test. The growth rate is -7.46%, with an absolute $t = 12.4$, which exceeds the critical $t_{05} = 2.228$. This indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The result indicates that the 15-second sandbag kicking performed by the traditional martial arts athlete from Bac Lieu province tends to diminish following the implementation of the weight loss method.

3.3.3 Speed

- The average 30-meter run time for the traditional martial arts athlete from Bac Lieu province was 4.48 seconds in the initial test and 4.7 seconds in the subsequent test. The growth rate is 4.79%, with an absolute $t = 16.5 > t_{05} = 2.228$. This indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The result indicates that the 30-meter sprint time of the male traditional martial arts athlete

from Bac Lieu province generally decreases following the implementation of the weight loss method.

- The mean duration for the 10x4 meter shuttle run among Bac Lieu province's traditional martial arts athletes was 4.53 seconds in the initial test and 4.76 seconds in the subsequent test. The growth rate is 4.95%, with an absolute $t = 6.17 > t_{05} = 2.228$. This figure indicates statistically significant growth at a probability threshold of $P \leq 0.05$. The result indicates that the 10 × 4 meter shuttle run time of the male athlete from Bac Lieu province's traditional martial arts team tends to improve following the implementation of the weight loss method.

3.3.4 Endurance

- The mean Cooper test score for male traditional martial arts athletes from Bac Lieu province was 3315 meters in the initial assessment and 2875 meters in the subsequent assessment. The growth rate is -14.22%, with an absolute $t = 1.98 > t_{05} = 2.228$. This result indicates statistically significant growth at a probability threshold of $P \leq 0.05$. This conclusion indicates that the Cooper test results for male traditional martial arts athletes from Bac Lieu province, following the implementation of the weight loss procedure, tend to decline. Based on the above results, it can be observed that following the application of the weight loss method, the physical fitness of male traditional martial arts athletes from Bac Lieu province in 2024 declined relative to their condition before weight loss.

After conducting our research, we collaborated with the coach to determine the best training strategies and weight loss methods for the athlete in 2025. To ensure optimal content and physical conditioning before the tournament, the following guidelines are recommended: Weight loss should be maintained for a period of 2-3 months or at a minimum of 1 month before the event, and training sessions should span 1-2 hours, as the body begins utilizing fat as an energy source after 30 minutes of exercise. Obtain an adequate amount of energy; it is safest to supply approximately 900 kcal per day, and the intake should not be excessively low. During the process of weight loss, it is crucial to sustain a consistent water consumption of 2–3 liters per day. Refrain from employing methods that limit water intake or induce excessive perspiration. This method fails to reduce excess fat and instead causes depletion, which negatively affects the body.

The research findings indicate that prior to the weight loss phase, male traditional martial arts athletes from Ca Mau province exhibited comparatively high and consistent levels of physical fitness, as evidenced by low coefficients of variation in strength, speed strength, speed, and endurance measures. The training profile of traditional martial arts athletes during the competition preparation period, when they cultivated specific physical attributes, aligns with this.

Following 15 days of pre-competition weight reduction, the athlete's body mass experienced a substantial decline, whereas the body fat percentage decreased only marginally and did not attain statistical significance. This result indicates that weight loss predominantly results from a reduction in water volume and non-fat constituents, rather

than from a decrease in body fat. This is a prevalent feature in combat sports with weight classes, where competitors are required to lose weight within a limited timeframe before the event.

The dehydration assessment results indicated that the athletes' average level of dehydration was approximately 2% of their body weight. According to biomedical research, this level of dehydration has begun to disrupt physiological functions, such as thermoregulation, circulation, and the ability to maintain exercise performance. These findings may account for the phenomenon of diminished comfort, reduced adaptability, and the potential risk of impairing athletes' physical endurance and competitive performance.

Based on the results and analysis presented above, it is evident that the implementation of scientifically grounded, controlled weight loss techniques—integrating dietary modifications, appropriate physical activity, and monitoring hydration and electrolyte balance—is a crucial factor in minimizing adverse effects on athletes' physical fitness. At the same time, the weight management process needs to be tailored to fit the physiological needs and competitive needs of each traditional martial arts athlete.

4. Conclusion

Before the weight loss phase, the male traditional martial arts athlete from Ca Mau province, Vietnam, exhibited relatively adequate and balanced physical fitness, as demonstrated by assessments of strength, speed-strength, speed, and endurance, with the coefficient of variation for all indicators remaining below 10%.

The findings following weight reduction indicated a minor reduction in the athlete's body fat percentage (Fat%) after 15 days of weight loss; however, this change was not statistically significant ($P > 0.05$). During training sessions of approximately 120 minutes, male traditional martial arts athletes from Ca Mau province exhibited an average dehydration level of 2% of their body weight.

The outcomes of all physical fitness assessments following weight loss were inferior to those conducted before weight loss, and this difference was statistically significant ($p<0.05$).

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

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