Hey athlete, you need to cut weight: weight loss guidance practices and perceptions of Chinese combat sports coaches.

ZHONG, Yuming <http://orcid.org/0009-0005-9672-8067>, WELDON, Anthony, LUO, Yanzhen, KIRK, Christopher, LI, Pengchao, ZHANG, Zhao, CHEN, Chao, XU, Kai, YIN, Mingyue, TAO, Meiling, REN, Zihan, WU, Yukun, LIU, Shaoyun, I GEE, Thomas, LAKICEVIC, Nemanja, LANGAN-EVANS, Carl and LI, Yongming <http://orcid.org/0000-0001-9654-0199>

Routledge
Taylor & Francis Group

Journal of the International Society of Sports Nutrition

ISSN: 1550-2783 (Online) Journal homepage: www.tandfonline.com/journals/rssn20

Hey athlete, you need to cut weight: weight loss guidance practices and perceptions of Chinese combat sports coaches

Yuming Zhong, Anthony Weldon, Yanzhen Luo, Christopher Kirk, Pengchao Li, Zhao Zhang, Chao Chen, Kai Xu, Mingyue Yin, Meiling Tao, Zihan Ren, Yukun Wu, Shaoyun Liu, Thomas I Gee, Nemanja Lakicevic, Carl Langan-Evans & Yongming Li

To cite this article: Yuming Zhong, Anthony Weldon, Yanzhen Luo, Christopher Kirk, Pengchao Li, Zhao Zhang, Chao Chen, Kai Xu, Mingyue Yin, Meiling Tao, Zihan Ren, Yukun Wu, Shaoyun Liu, Thomas I Gee, Nemanja Lakicevic, Carl Langan-Evans & Yongming Li (2025) Hey athlete, you need to cut weight: weight loss guidance practices and perceptions of Chinese combat sports coaches, Journal of the International Society of Sports Nutrition, 22:1, 2565385, DOI: 10.1080/15502783.2025.2565385

To link to this article: https://doi.org/10.1080/15502783.2025.2565385

JOURNAL OF THE INTERNATIONAL SOCIETY OF SPORTS NUTRITION
2025, VOL. 22, NO. 1, 2565385
https://doi.org/10.1080/15502783.2025.2565385

Taylor & Francis
Taylor & Francis Group

Hey athlete, you need to cut weight: weight loss guidance practices and perceptions of Chinese combat sports coaches

Yuming Zhong[a], Anthony Weldon[b,c], Yanzhen Luo[d], Christopher Kirk[e], Pengchao Li[f], Zhao Zhang[g], Chao Chen[h], Kai Xu[a], Mingyue Yin[a], Meiling Tao[a], Zihan Ren[i], Yukun Wu[j], Shaoyun Liu[k], Thomas I Gee[l], Nemanja Lakicevic[m,n], Carl Langan-Evans[o] and Yongming Li[a,p]

[a]Shanghai University of Sport, School of Athletic Performance, Shanghai, China; [b]Birmingham City University, Centre for Life and Sport Sciences, Birmingham, UK; [c]Aston Villa Foundation, Birmingham, UK; [d]Baima Secondary School, Changsha, Hunan, China; [e]Sheffield Hallam University, Sport and Human Performance Research Group, Sheffield, UK; [f]Beijing Sport University, School of Arts, Beijing, China; [g]Krirk University, Bangkok, Thailand; [h]Dalian University, College of physical education, Liaoning, China; [i]Henan University, Wushu College, Henan, China; [j]Dali University, Yunnan, China; [k]Shaolin Tagou Wushu School, Henan, China; [l]University of Lincoln, School of Psychology, Sport Science, and Wellbeing, Lincoln, UK; [m]Lomonosov Moscow State University, Faculty of Psychology, Moscow, Russia; [n]Federal Scientific Center of Psychological and Interdisciplinary Research, Moscow, Russia; [o]Liverpool John Moores University, School of Sport and Exercise Sciences, Liverpool, UK; [p]China Institute of Sport Science, Shanghai, Beijing, China

ABSTRACT

Background: Weight loss (WL) before competition is a widespread practice in combat sports (CS). Among the various factors influencing athletes' WL practice, coaches are consistently identified as the most influential in terms of guiding athletes' WL practices. However, little is known about coaches' guidance practices and perceptions of WL. Therefore, the aim of this study is to examine the WL guidance practices and perceptions of Chinese CS coaches.

Methods: The study employed an observational cross-sectional approach and adopted convenience sampling. The questionnaire consisted of 22 questions and featured four sections: (i) general information, (ii) personal experience, (iii) WL guidance practice, and (iv) perception about WL. It employed different response formats, including (i) 6 short-answer (fill-in-the-blank) questions, (ii) 15 single-choice questions consisting of 4 dichotomous items, 7 multiple-category items, and 4 Likert-type scale items, and (iii) 1 multiple-choice question. In total, 135 coaches completed the questionnaire and responses from 122 coaches (115 males, 7 females, 33.2 ± 7.1 years old) representing 10 CS modalities were included in the analysis.

Results: A high proportion of coaches reported being aware of their athletes' body mass (95%), as well as having previously required their athletes to undergo WL before competitions (96%), and having personally guided them through the WL process (94%). The primary basis for coaches' guidance on WL was their own experience as former athletes (81%). The most recommended WL method by coaches was increasing exercise (57%). The frequency of consultation with nutritionists/doctors did not differ significantly across coaching certification level ($p = 0.286$), perception of the impact of WL on health ($p = 0.676$), and perception of the impact of WL on performance ($p = 0.751$). Coaches considered 18.1 ± 3.5 years as the appropriate age for athletes to initiate WL, and 6.0% ± 2.7% of body mass as the appropriate highest WL magnitude. Typically, they advised athletes to begin WL 41.4 ± 17.5 days before competition. Most coaches perceived themselves as having "some influence" (50%) over their athletes' WL practices. The primary reason coaches ($n = 117$) encouraged WL was to "compete against lighter opponents to enhance winning potential" (69%). Most coaches believed that WL negatively impacts health (41%) and optimizes performance (49%). Regarding fairness in competition, most coaches believed that WL does not create an unfair competition (72%). The age at which coaches recommended athletes to begin WL differed significantly only in relation to sports discipline ($p < 0.001$), main competition level participated by the athlete they coached ($p < 0.001$), and perception of the impact of WL on health ($p < 0.001$), while no significant differences were observed across the remaining 24 independent variables (all p-values > 0.05).

ARTICLE HISTORY
Received 1 April 2025
Accepted 17 September 2025

KEYWORDS
Weight cutting; weight cycling; sports nutrition; weight class; combat sport

CONTACT Yongming Li liyongming@sus.edu.cn School of Athletic Performance, Shanghai University of Sport, Changhai Road 399, Yangpu District, Shanghai, 200438 China

Supplemental data for this article can be accessed online at https://doi.org/10.1080/15502783.2025.2565385

Conclusions: Coaches are the primary drivers of pre-competition WL practices in CS, actively requiring athletes to reduce weight to compete in lower categories. While many coaches recognize potential health risks, a substantial proportion perceive WL as neutral or beneficial, and their recommendations are often based on personal experience rather than scientific evidence. Coaches' perceptions influence the risk level of methods they recommend.

1. Background

Systematic reduction of body mass, colloquially called weight-loss (WL) [1], before competition is a widespread practice in combat sports (CS) and has been extensively documented in the literature [2–6]. In an attempt to ensure fairness in regard to size and physical capacity, CS categorize athletes into weight classes [7]. Consequently, athletes often aim to compete in a lower weight category than their habitual body mass, to enhance perceived competitiveness and chances of competitive success [8]. To achieve the required competition weight, athletes adopt various methods to rapidly or chronically reduce body mass before weigh-in and then subsequently attempt to regain body mass before competition [2,9,10]. Consequently, research has shown that in judo, boxing and regional mixed martial arts (MMA) competitions, winners have greater body mass regain after WL, though this pattern does not occur in elite MMA [9–11].

Research indicates that CS athletes typically reduce their body mass by less than < 5% in the 7–14 days leading up to competition [2]. However, athletes in Sambo, MMA, and muay Thai often undergo more aggressive WL [2,12]. Among the most used WL methods are increased exercise and training with plastic suits, with extreme practices such as using diuretic and diet pills also being reported [2]. Despite substantial evidence highlighting the negative impacts of WL on health and performance [7,13–15], many athletes continue to engage in WL [8,16,17], illustrating the persistent gap between scientific research and practice.

Among the various factors influencing athletes' WL practice, coaches are consistently identified as the most influential in terms of guiding athletes' WL practices [2,12]. This influence likely stems from the coach's overarching role in an athlete's training, competition planning, and health management [3,18,19]. A critical aspect underpinning the strategy of WL is the competition weight category coaches have chosen for their athletes (whether a mutual decision or not) [20], which aims to leverage their experience to maximize winning potential. Additionally, given that many athletes begin WL during adolescence [2,21], often lacking sufficient nutritional knowledge (especially sports and CS nutrition knowledge) [22], coaches' personal experiences with WL become a primary source of WL guidance [3]. Certain WL methods, such as increasing exercise volume or training with plastic suits, are inherently tied to training sessions, which may further reinforce the coach's influence on athletes' WL practices.

A 1993 study on high school wrestling coaches found mixed opinions on WL risks and regulation [20]. While most agreed that some wrestlers lose excessive body mass and that parents should be involved, 58% believed winning was the primary motivation for WL. Coaches actively influenced athletes' WL, with 96% assisting in planning and 82% reminding athletes, and even 2% providing diuretics and 1% providing laxatives. A more recent study on judo and taekwondo coaches revealed that 90% of coaches supervised their athletes' WL processes [23]. On average, coaches recommended a WL period of 16.2 ± 8.2 days, with an average WL magnitude of 1.5 ± 0.7 kg. Regarding WL methods, most coaches recommended that their athletes practice gradual dieting (92%), followed by increased exercise (80%), sweat suits (51%), restricted fluid intake (39%), training in heated rooms (27%), and sauna (26%). Additionally, more extreme practices, such as the use of laxatives (21%), diuretics (21%), diet pills (21%), or induced vomiting (21%), were also reported. These studies affirmed that coaches actively supervise WL and provided insights into their attitudes toward WL guidance practices and perceptions.

While these findings offer valuable insights into coaches' guidance and perceptions of WL, the study was limited to wrestling, judo and taekwondo coaches, making it difficult to generalize findings to other CS, particularly Sambo, MMA, and muay Thai, where athletes often engage in more extreme WL practices. Furthermore, cultural differences across countries may shape coaches' practices and perceptions on WL [2,3], highlighting the need for cross-national comparisons. Given China's strong presence and performance in international CS competition, understanding how Chinese CS coaches approach WL is particularly valuable.

Therefore, this study addresses a critical gap by examining Chinese CS coaches' WL guidance practices and perceptions, offering insights for more effective practices in CS.

2. Materials and methods

2.1. Experimental approach to the problem

This study employed an observational cross-sectional approach using a questionnaire to ascertain the WL guidance practices and perceptions of Chinese CS coaches. To target the relevant population, this study adopted convenience sampling [3]. The study followed the cross-sectional reporting guidelines outlined by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) [24], ensuring transparency and consistency in observational research practices.

2.2. Participants

The recruitment of participants included online and in-person recruitment. For online recruitment, a questionnaire link was sent to the managers of CS teams through social media (WeChat, Tencent, China), requesting this to be shared with their CS coaches [25]. Paper questionnaires were distributed for in-person recruitment at a major national training center. The CS team managers assisted in recruiting participants during daily sports team meetings. All coaches who agreed to participate in the in-person questionnaire were gathered in a conference room to complete the questionnaire [26]. If any questions were unclear, researchers were available to provide detailed explanations, but they were instructed to avoid suggesting or influencing any specific responses. Online respondents can contact the researchers through the phone number provided in the informed consent form to seek assistance and obtain the same explanations as those provided by the in-person participants. During this process, the questionnaire platform enables respondents to exit the questionnaire filling and save their current answers, and then they can resume filling the questionnaire at any time. To further ensure the integrity of the data, all explanations were strictly factual, and researchers were careful to clarify only the meaning of the questions without guiding the coaches toward particular answers. Before the application of the questionnaire, participants were orally briefed on the instrument for the in-person survey, while written information was provided for the online survey before signing informed consent. The inclusion criteria for coaches were as follows: (i) consent to participate in research, and (ii) working as a CS coach in the past year, directly supervising athletes' training and competition, with no prerequisite of specific license, qualification, or membership. In total, 135 participants completed the questionnaire. The lead author (***Remove for peer review***) pre-checked all responses, and 13 responses (10%) were deemed invalid based on criterion (ii). Furthermore, responses with the same IP address, completion time of less than 6 min, and answers unrelated to the questions were also considered invalid, but no such responses were found. Finally, 122 responses (88 online, 34 in-person) were included in the analysis. Approval for conducting the study was secured from the ***Remove for peer review***.

2.3. Questionnaire development and administration

Open access application WJX web platform (WENJUANXING, www.wjx.cn) was used to construct, distribute, and collect all questionnaire responses. Responses from paper questionnaires were manually input into the WJX web platform by the lead author (***Remove for peer review***). Similar to Berkovich et al.'s study [23], the questionnaire used in this study was based on the Artioli et al.'s rapid WL questionnaire [27] and its Chinese version used in Zhong et al.'s work [3], while also being informed by Berkovich et al.'s findings on coaches' WL guidance practice [23]. In addition, several new questions were incorporated to gain deeper insights into coaches' WL guidance practices and perceptions. For example: "*are you aware of your athletes' body weight?*," "*have you ever required your athletes to undergo pre-competition WL?*," "*how frequently do you communicate with nutritionists/doctors regarding WL?*." The questionnaire consisted of 22 questions and featured four sections: (i) general information, (ii) personal experience, (iii) WL guidance practice, and (iv) perception about WL (see Appendices). It employed different response formats, including 6 short-answer

(fill-in-the-blank) questions (e.g. your age?), 15 single-choice questions consisting of 4 dichotomous items (e.g. "Are you aware of your athletes' body mass?" yes/no), 7 multiple category items (e.g. "At what competitive level do your athletes mainly participate?" school-level/regional/provincial/national/international), and 4 Likert-type scale items (e.g. "How frequently do you typically communicate with doctors or nutritionists regarding athletes' weight loss?" always/often/sometimes/rarely/never), as well as 1 multiple-choice question (e.g. "Why do you require your athletes lose weight pre-competition?" with several options available for selection). The content validity of the Chinese version of the questionnaire was evaluated by a researcher with extensive experience in the field of CS and five CS coaches through pilot tests. Feedback from this process led to modifications in two questions adopted from Berkovich et al.'s study [23]. The first change was from "*age of athlete that advice is given regarding weight loss prior to competition*" to "*at what age do you think an athlete should first undergo pre-competition weight loss*?" Coaches reported that they work with athletes of various ages and found it difficult to answer the original question. They suggested revising it to reflect the age they personally consider appropriate for initiating WL. The second modification was changing "weight loss recommended by coach prior to competition (kg)" to "If one of your athletes currently weighs 60 kg, what is the maximum amount of weight you would recommend they lose before competition?" Coaches noted that their athletes compete in different weight classes, and using kilograms as a general unit was not standardized. By specifying a set body weight, the revised question provides a clearer reference point. Additionally, their feedback prompted slight modifications to the Chinese wording of certain questions to better suit the target audience. Data collection was conducted from November 29 2024 to February 5 2025.

2.4. Statistical analyses

All analyses were performed using SPSS 27.0 (IBM Corp., Armonk, New York) and *R* (version 4.3.0; R Core Team, Vienna, Austria). Descriptive statistics were used to summarize all results. Continuous variables were presented as mean (± SD), and categorical variables as frequencies (%). The Kolmogorov – Smirnov test was used to check data normality. All three continuous variables tested violated parametric assumptions of normality. Statistical analysis used in this study are presented in Appendices 1. Significance was accepted at $p < 0.05$. To address the issue of inflated significance levels due to multiple comparisons, Bonferroni adjustments were applied to both multiple Kruskal-Wallis' tests and its post-hoc tests using *R* and SPSS. The frequency of choice of "always" and "sometimes" in recommended WL methods is combined to describe the participants' primary WL methods, as both represent current recommendations. Similarly, the frequency of choice of "very dependent" and "fairly dependent" in dependence of WL guidance bases is combined to describe the coaches' degree of dependence of different WL guidance basis, as both choices represent dependent and others represent no clear dependence.

3. Results

3.1. General information

In total 135 coaches completed the questionnaire and 122 coaches (115 males, 7 females) met the inclusion criteria. The average age of the coaches was 33.2 ± 7.1 years old (range: 22–56 years old). These coaches represent a total of 10 CS modalities, including boxing (n = 36, 30%), followed by Sanda (n = 28, 23%), judo (n = 14, 11%), kickboxing (n = 14, 11%), Sambo (n = 8, 7%), taekwondo (n = 6, 5%), wrestling (n = 6, 5%), MMA (n = 6, 5%), Brazilian jiu-jitsu (n = 3, 2%), muay Thai (n = 1, 1%).

3.2. Personal experience

Most coaches held a Chinese primary-level coaching certification (level-1) (n = 65, 53%), followed by advanced-level coaching certification (level-3) (n = 19, 16%), intermediate-level coaching certification (level-2) (n = 14, 11%), no coaching certification (n = 14, 11%), and national-level coaching certification (level-4) (n = 10, 8%). These coaches began training as athletes in their current sports at an average age of 14.2 ± 3.2 years old, started coaching in the same sport at 23.6 ± 3.5, and had an average of 9.7 ± 6.2 years of

coaching experience. Most coaches primarily train athletes competing at the regional level (n = 36, 30%), followed by national (n = 34, 28%), provincial (n = 28, 23%), school level (n = 15, 12%), and international levels (n = 9, 7%).

3.3. WL guidance practices

An overall majority of coaches reported being aware of their athletes' weight (n = 116, 95%), having previously required their athletes to undergo WL before competitions (n = 117, 96%), and personally guiding them through the WL process (n = 115, 94%). Only 117 coaches who answered "Yes" to the question "have you ever required your athletes to lose weight before competition?" were asked to provide the answer for "why do you require your athletes lose weight pre-competition?" The primary reason coaches required their athlete to lose weight was to "*compete against lighter opponents to enhance winning potential*" (n = 82, 70%), followed by "*optimizing athletic performance (e.g. faster speed)*" (n = 77, 66%), "*athletes weighing above their usual body mass, which may be detrimental to competition performance*" (n = 62, 53%), "*uncertainty but believing it may be beneficial*" (n = 38, 32%), "*considering WL as a necessary pre-competition process*" (n = 36, 31%), and "*since everyone cuts body mass, athletes have no choice but to follow*" (n = 34, 29%). A smaller proportion of coaches indicated they often (n = 44, 36%) consult with medical professionals or nutritionists regarding WL, followed by responses of sometimes (n = 42, 34%), always (n = 22, 18%), rarely (n = 11, 9%), and never (n = 3, 2%). The primary basis for coaches' guidance on WL was their own experience as former athletes (n = 99, 81%) (see Table 1). The most recommended WL methods by coaches included increasing exercise (n = 69, 57%), training in rubber/plastic suits (n = 61, 50%), intentionally training in a heated room (n = 58, 48%), gradual dieting (n = 50, 41%), and sauna (n = 46, 38%) (see Table 2). The results of the inferential statistics regarding coaches' WL guidance practices are presented in Table 3, including only the significant results.

Table 1. Frequency analysis (%) of the reliance of different weight loss guidance of Chinese combat sports coaches (n = 122).

	Very reliant		Some reliant		Unsure		Little reliant		Not reliant	
	n	%	n	%	n	%	n	%	n	%
Experience as former athletes	56	46	43	35	10	8	7	6	6	5
Information acquired through coaching certification or education programs	46	38	45	37	16	13	7	6	8	7
Recommendations and practice from other coaches	27	22	47	39	25	20	16	13	7	6
Recommendations from nutritionists/doctors	48	39	38	31	17	14	10	8	9	7
Online sources	25	20	33	27	29	24	18	15	17	14
Others	20	16	31	25	16	13	5	4	50	41

Table 2. Frequency analysis (%) of the weight loss methods recommended by Chinese combat sports coaches (n = 122).

	Always		Sometimes		Almost Never		Never Used		Do Not Use Any More	
	n	%	n	%	n	%	n	%	n	%
Gradual dieting	26	21	24	20	37	30	21	17	14	11
Skipping meals	6	5	19	16	50	41	37	30	10	8
Fasting	0	0	8	7	38	31	66	54	10	8
Restricting fluid ingestion	7	6	23	19	42	34	39	32	11	9
Increased exercise	37	30	32	26	30	25	17	14	6	5
Training in a heated room	16	13	42	34	33	27	27	22	4	3
Sauna	10	8	36	30	38	31	28	23	10	8
Training in plastic suits	25	20	36	30	31	25	20	16	10	8
Use plastic suit all-day	6	5	16	13	39	32	52	43	9	7
Spitting	2	2	11	9	35	29	64	52	10	8
Laxatives	1	1	9	7	30	25	70	57	12	10
Diuretics	0	0	9	7	28	23	77	63	8	7
Diet pills	2	2	5	4	30	25	74	61	11	9
Vomiting	2	2	4	3	31	25	76	62	9	7
Hot water immersion	1	1	21	17	39	32	48	39	13	11
Hot saltwater immersion	2	2	17	14	40	33	58	48	5	4
Others	4	3	9	7	25	20	72	59	12	10

Table 3. The tests that revealed significant differences in present study.

Method	Dependent variable	Independent variables	p value
Kruskal-Wallis' tests	Recommended age where WL practices should begin	Sports discipline	<0.001
		Main competition level participated by athlete they coached	<0.001
		Perception of the impact of WL on health	<0.001
	Recommended WL duration	Coaches' frequency of recommending training in plastic suits	<0.001
Chi-square tests	The degree to which coaches relied on "their own experience as former athletes" as a basis for WL guidance	Coaching certification level	0.012
	The degree to which coaches relied on "information acquired through coaching certification or education programs" as a basis for WL guidance	Perception of the impact of WL on health	0.013
	The degree to which coaches relied on "the recommendations and practice from other coaches" as a basis for WL guidance	Perception of the impact of WL on health	<0.001
	The degree to which coaches relied on "recommendations from nutritionists and doctors" as a basis for WL guidance	Perception of the impact of WL on health	0.043
		Main competition level participated by athlete they coached	0.004
	The degree to which coaches relied on "online sources" as a basis for WL guidance	Perception of the impact of WL on health	0.002
		Main competition level participated by athlete they coached	<0.001
	Coaches' frequency of recommending gradual dieting	Perception of the impact of WL on health	0.008
	Coaches' frequency of recommending increased exercise	Perception of the impact of WL on health	<0.001
	Coaches' frequency of recommending training in a heated room	Perception of the impact of WL on health	0.009
	Coaches' frequency of recommending training in plastic suits	Perception of the impact of WL on health	0.003
	Coaches' frequency of recommending laxatives	Perception of the impact of WL on health	0.003
	Coaches' frequency of recommending diuretics	Perception of the impact of WL on health	0.017
	Coaches' frequency of recommending diet pills	Perception of the impact of WL on health	0.044

WL, weight loss.

3.4. Perceptions about weight-loss

On average coaches considered 18.1 ± 3.5 years old (range: 12–25 years old) to be the appropriate age for athletes to undertake their first pre-competition WL. If an athlete currently weighs 60 kg, coaches recommend a maximum average WL of 3.6 ± 1.6 kg (6.0 ± 2.7% body mass) before competition. Typically, they advised athletes to begin WL an average 41.4 ± 17.5 days before competition. Most coaches perceived themselves as having some influence (n = 61, 50%) over their athletes' WL practices, followed by responses of unsure (n = 19, 16%), little influence (n = 17, 14%), high influence (n = 14, 11%), and no influence (n = 11, 9%). Most coaches believed that WL negatively impacts health (n = 50, 41%), followed by those who believed it improves health (n = 36, 30%), or has no effect (n = 36, 30%). Regarding performance, most coaches considered WL to be "fairly important" (n = 36, 30%) for competition performance, followed by responses of "very important" (n = 26, 21%), "moderately important" (n = 26, 21%), "slightly important" (n = 21, 17%), and "not important at all" (n = 2, 2%). Similarly, most coaches believed that WL optimizes performance (n = 60, 49%), followed by those who considered it detrimental (n = 34, 28%) or having no impact (n = 28, 23%). Regarding fairness in competition, most coaches believed that WL does not create an unfair competition (n = 88, 72%), followed by those who were uncertain (n = 23, 19%) and those who believed it does (n = 11, 9%).

The age at which coaches recommended athletes to begin WL differed significantly only in relation to sports discipline ($p < 0.001$), main competition level participated by the athlete they coached ($p < 0.001$), and perception of the impact of WL on health ($p < 0.001$), while no significant differences were observed across the remaining 24 independent variables (all p-values > 0.05). Post-hoc tests revealed that Sambo coaches

recommended a significantly later age for the initiation of WL practices (22.1 ± 1.8 years) compared to wrestling (14.5 ± 0.8 years, $p = 0.001$), taekwondo (15.3 ± 1.2 years, $p = 0.014$), and Sanda (15.6 ± 2.1 years, $p < 0.001$) coaches. Similarly, judo coaches recommended a significantly later age (20.4 ± 3.8 years) compared to wrestling (14.5 ± 0.8 years, $p = 0.011$) and Sanda (15.6 ± 2.1 years, $p = 0.003$) coaches. Coaches working with athletes competing at the provincial (16.3 ± 3.1 years) and national (16.4 ± 2.2 years) levels recommended significantly earlier age for the initiation of WL practices than those coaching at the regional level (20.6 ± 3.0 years, $p < 0.001$, $p = 0.001$) and school level (20.7 years, $p < 0.001$, $p = 0.001$). Additionally, coaches working with athletes competing at the international level athletes (16.4 ± 2.5 years) recommended significantly earlier age for the initiation of WL practices compared to coaches working with regional level athletes (20.6 ± 3.0 years, $p = 0.025$). Coaches who perceived WL as beneficial to health (20.2 ± 2.7 years) recommended a significantly later age for the initiation of WL practices than those who considered WL to have no impact (17.3 ± 3.5 years, $p < 0.001$) or to be detrimental (17.3 ± 3.3 years, $p < 0.001$).

No significant differences were found in the magnitude of WL that coaches recommended across any of the 27 independent variables (all p-values > 0.05).

The number of days coaches recommended for WL differed significantly only in relation to the frequency of recommending training in plastic suits ($p < 0.001$), while no significant differences were observed across the remaining 26 independent variables (all p-values > 0.05). Post-hoc tests revealed that coaches who never recommended training in plastic suits (51 ± 16.9 days) prescribed a significantly longer WL duration compared to those who sometimes (35.1 ± 17.7 days, $p = 0.010$) or always (35 ± 13.0 days, $p = 0.017$) recommended this method.

4. Discussion

This is the first study to investigate the WL guidance practices and perceptions of Chinese CS coaches. Our primary findings include: (i) nearly all coaches reported having previously required their athletes to undergo WL before competitions, and having personally guided them through the WL process; (ii) the primary basis for coaches' guidance on WL was their own experience as former athletes; (iii) the primary reason coaches encouraged WL was to "compete against lighter opponents to enhance winning potential"; (iv) most coaches believed that WL negatively impacts health, and optimizes performance; (v) the frequency with which coaches recommend different WL methods only differed between their perception of WL's impact on health, and all their WL guidance practice did not differ between their perceptions about its impact on performance; (vi) coaches' WL guidance practices and perceptions did not differ between frequency of consultations with nutritionists/doctors; (vii) the WL magnitude, duration, and methods recommended by coaches in this study closely resemble findings from earlier research on Chinese boxers [3].

4.1. Coaches' WL guidance practices

This study highlights that coaches play an active and central role in requiring and supervising WL, rather than merely overseeing the process as reported in earlier study [23]. Previous studies have consistently identified coaches as the most influential figures in shaping athletes' WL practices [2–4,6,17,28,29]. This high influence likely explains the persistently high prevalence of WL [2], despite ongoing efforts by governing bodies to discourage it [30–32] due to concerns about health risks, negative impacts on performance, and the potential for disordered eating behaviors among athletes [7,33–45]. Consequently, sports authorities should recognize coaches as central to addressing this issue and prioritize their education on WL-related risks and best practices [23]. Furthermore, earlier research found that boxers' WL practices were unrelated to their own nutritional knowledge [46], likely due to the strong influence of their coaches. For example, when a coach believes or explicitly demands that an athlete must compete in a lower weight category, the athlete is significantly more likely to engage in WL. Indeed, our study confirms that the primary motivation behind coaches' promotion of WL is to enable athletes to compete against lighter opponents. This is a strategy neither coaches nor athletes are likely to forgo, as they believe it enhances their chances of victory [23,47]. Athletes, especially those with extensive competition experience, are aware of their likelihood of success in different weight categories based on their familiarity with potential opponents.

Additionally, the deeply embedded WL culture in CS further reinforces this practice [48]. As results showed in this study, ~30% of coaches reported encouraging athletes to cut weight partly due to reasons such as "*since everyone cuts body mass, athletes have no choice but to follow*," "*considering WL as a necessary pre-competition process*," or "*uncertainty but believing it may be beneficial*." Such reasoning underscores the prevailing cultural and environmental influences that drive WL practices in CS.

The primary basis for coaches' WL guidance is often their own experiences as athletes, consistent with previous study on Israeli judo and taekwondo coaches [23], which presents both advantages and risks. On one hand, these first-hand experiences may provide valuable practical insights. On the other hand, coaches may lack formal education in nutrition [49–51], and strategies that were effective for them may not necessarily be safe or suitable for all athletes. This variability underscores the importance of evidence-based approaches to ensure both the effectiveness and safety of WL strategies [30]. Furthermore, athletes often begin the initiation of WL practices practice during adolescence [2], a period when understanding of nutrition may be more limited. As a result, they may be less likely to discern the benefits and risks of different WL strategies and may be more likely to follow the coach's guidance. Most coaches report that they often or sometimes consult nutritionists and doctors for guidance on WL, which seems to enhance the reliability of their recommendations. Since most sports teams in China do not have nutritionists or doctors, and athletes cannot access nutritionists or doctors, especially for seeking advice on WL-related issues. Therefore, coaches may consult nutritionists or doctors through personal means (such as the internet and their own friends) regarding WL-related issues, thereby optimizing the WL guidance provided to the athletes [45,52]. However, surprisingly, coaches who regularly consult with nutritionists and doctors are not significantly different from those who rarely do so in terms of their bases of WL guidance or the WL methods they recommend. Moreover, most coaches have reported that their WL guidance is largely based on the recommendations of nutritionists and doctors, suggesting that most coaches do not necessarily dismiss the advice of nutritionists. Rather, the alignment between the nutritionist's advice and the coach's approach may explain why coaches' WL guidance practices did not differ across the frequency of consultations with nutritionists and doctors. Future research could involve interviews with coaches, nutritionists, and doctors working with CS athletes to better understand their interactions regarding WL and the potential barriers that exist. Additionally, the results showed that coaches of athletes participating in school level or regional level competitions tend to rely more on online resources and less on nutritionists/doctors' advice. This may be due to the limited availability of nutritionists/doctors within their sports teams, compelling coaches to seek WL information from alternative sources.

The WL methods most frequently recommended by coaches in this study – such as increased exercise, training in heated room or plastic suits, gradual dieting, and sauna use – were similar to those reported in previous surveys on coaches [23] and athletes [4–6,29,45,52–61]. In particular, these methods closely resembled the findings from Chinese boxers, kickboxers, and Sanda athletes [3,52,60], further reinforcing the strong influence of coaches on athletes' WL practice. Rather than being shaped by access to professional consultation, our findings suggest that coaches' recommendations are primarily driven by their perceptions of WL's health implications. Specifically, coaches who perceived WL as either detrimental or having no impact on health were more likely to recommend gradual dieting, increased exercise, training in heated rooms, and training in plastic suits. In contrast, those who believed WL were beneficial to health were more likely to recommend laxatives, diuretics, and diet pills. This suggests that coaches who perceive WL as beneficial to health may lack fundamental nutritional knowledge, leading them to endorse questionable and potentially harmful methods [22]. Conversely, those who consider WL detrimental to health may have a better understanding of nutrition and weight management principles, favoring lower-risk approaches. However, as this study did not directly assess coaches' nutritional knowledge, this interpretation remains speculative. Future research should explore the relationship between coaches' nutrition knowledge and their WL guidance practices. Additionally, no significant difference was found between coaches' perception of WL's impact on performance and the frequency with which they recommended different WL methods. This suggests that coaches may not fully understand the effects of various WL strategies on athletic performance. Interestingly, optimizing athletes' performance was reported as the second most common reason for implementing WL. This finding highlights the lack of WL-related knowledge among coaches, which ultimately reduces the effectiveness of their guidance.

4.2. Coaches' perceptions about weight-loss

Overall, coaches recommended that athletes undertake their initiation of WL practices attempt at an average age of 18.1 years, higher than value reported in Israeli judo and taekwondo coaches (12.4–13.3 years old) [23] and Chinese boxers (15.1 years old), kickboxers (15.4 years old), and Sanda athletes (17.0 years old) [3,52,60]. This appears appropriate, as initiating WL during adolescence can negatively affect growth and development, whereas the same practice tends to have a relatively smaller impact on adult athletes [62–66]. Intentional energy deficits and hypohydration during physical training and competition in childhood or adolescence can disturb metabolic and hormonal regulations affecting growth, maturation, body composition, menstrual cycles and reproductive capacity [62]. Female judo athletes who experienced WL during the development of secondary sexual characteristics were significantly shorter in height than those who did not [67]. Our findings also showed that certified coaches tended to recommend a later starting age than their uncertified counterparts, likely attributed to the mandatory nutrition knowledge component in China's coaching certification examinations, which requires candidates to demonstrate a certain level of nutritional competence to pass [68]. This suggests that formal education and certification may play an important role in reducing risky practices by equipping coaches with basic nutrition-related competence [69]. It is important to note that China's coaching certification system applies exclusively to Olympic sports [70]. Consequently, coaches in non-Olympic CS (i.e. MMA, muay Thai, Sambo, Brazilian jiu-jitsu) are unable to obtain certification unless they acquire a coaching qualification in an Olympic CS. While certified CS coaches may be less prevalent in non-Olympic sports clubs, it may be recommended that clubs require all CS coaches responsible for leading athletes in competitions to hold a coaching certification. This would help to ensure that coaches have been exposed to fundamental nutrition information.

Coaches in this study typically recommended an average WL magnitude of 3.6 ± 1.6 kg (6.0% of body mass), which was only comparable to values reported in some previous studies on athletes [6,16,53,54,61]. It was also lower than the values previously reported in studies on Chinese athletes in boxing, kickboxing, and Sanda [3,52,60]. Although studies suggest that losing more than 5% of body mass may have negative effects on athletes' health and performance [34], most weight divisions in CS are incremented by 3–4 kg (e.g. 52 kg, 56 kg, 60 kg, 64 kg in Sanda and 51 kg, 54 kg, 57 kg, 60 kg in boxing). This appears to influence the WL magnitude recommended by coaches. Surprisingly, despite sport-specific differences, muay Thai, Sambo, and MMA coaches did not recommend significantly greater WL magnitude than coaches from other disciplines [2,12]. This contradicts previous research, which consistently found that athletes in these three sports exhibited higher WL magnitude than those in other CS [2]. In fact, in this study, muay Thai coaches recommended the highest WL (5 kg, 8.3% of body mass), approximately double the amount recommended by Brazilian jiu-jitsu coaches (2.7 kg, 4.5% of body mass). However, this difference was not statistically significant, likely due to the small sample size. Additionally, considering the structure of weight divisions, when setting an athlete's initial weight at 60 kg, coaches typically advised cutting down to the next division (56 kg) rather than the one below that (52 kg), as an 8 kg loss (13% of body mass) would likely be excessive. Therefore, the weight division structure itself helps explain why the recommended WL magnitude did not significantly differ across other independent variables, such as coaching certification level, competition level of their athletes, or frequency of consultations with nutritionists/doctors.

Coaches recommended initiating pre-competition WL an average of 41.4 days before competition, higher than value reported in Israeli judo and taekwondo coaches (16–18 days) [23]. This also aligns with previous research on Chinese boxers, kickboxers, and Sanda athletes [3,52,60], which found that most athletes allocated 15+ days for WL prior to competition. This is generally considered a relatively safer approach, as a longer WL duration typically results in a lower daily WL%, thereby minimizing the potential negative effects of WL on athletes [7,33–44], particularly given that the recommended reduction was 6% of body mass. A study on male CS athletes demonstrated that seven weeks of daily energy availability fluctuations averaging 20 kcal·kg fat-free mass $(FFM)^{-1}$·day^{-1} led to reductions in both body mass and fat mass without disrupting physiological systems associated with the male athlete triad and Relative Energy Deficiency in Sport (RED-S). In contrast, a subsequent five-day period with energy availability <10 kcal·kg FFM^{-1} ·d^{-1} resulted in adverse consequences linked to the Male Athlete Triad and RED-S [71]. Coaches who recommended training in plastic suits tended to prescribe relatively shorter WL durations (35 days), likely due to the increased rate of WL facilitated by hypohydration. Research has

shown that wearing plastic suits can effectively induce body mass reduction during daily training [72]. However, the recommended WL duration did not differ between coaches' perceptions of WL effects on health and performance, further highlighting a lack of knowledge among coaches regarding WL guidance practices.

Most coaches perceived they had "some influence" over athletes' WL practices, while only a minority considered themselves "highly influential." This aligns with previous research on athletes [2–4,6,17,28,29]. It is important to note that although prior studies consistently identify coaches as the most influential figures in athletes' WL practices, some athletes still perceive their coaches as having "little influence" or "no influence" at all [2–4,6,17,28,29]. Overall, most coaches recognized their influence on athletes' WL practices. As previously mentioned, WL duration and methods recommended by coaches in this study closely resembled findings from earlier research on Chinese CS athletes, but the age at which athletes began WL and the highest WL magnitude (%) were not consistent with those earlier reports [3,52,60]. This suggests that athletes may partially follow their coaches' recommendations. Notably, both the present study and prior research on Chinese boxers, kickboxers, and Sanda athletes included participants from the Chinese major national training center [3,52,60]. This means that some of the athletes in that study were likely coached by individuals who participated in the present study, further reinforcing the reliability of certain conclusions. Future research should examine the relationship between the WL guidance practices and perceptions of coaches and athletes within the same teams. Such investigations could provide more direct insights into the extent of coaches' influence on athletes' WL practices.

Most coaches believed that WL is detrimental to health but beneficial to performance. This suggests that they recognize the health risks associated with WL but prioritize winning competitions over maintaining health. Of concern, a substantial proportion of coaches perceive WL as either beneficial to health or having no impact, especially considering the magnitude they currently recommend athletes to lose (3.3 kg, 5.5% body mass and 3.7 kg, 6.2% body mass). Furthermore, there were no significant differences in coaches' perceptions on the impacts of WL on health or performance based on the frequency of communication with nutritionists or doctors. This implies that frequent consultations with nutritionists/doctors may not appear to alter coaches' perceptions of the impact of WL on health and performance. It is concerning whether this is due to nutritionists/doctors being unaware of the athletes' specific situations or because they also lack knowledge about pre-competition WL in CS.

4.3. Limitations

This study has four main limitations. First, it relied on self-reported data, which is inherently subject to potential biases, including recall bias and social desirability bias. Second, the sample size for certain CS disciplines and female was relatively small, which may introduce potential bias. Third, the study was limited to Chinese CS coaches, which may restrict the global generalizability of the findings. Future research should examine CS coaches in other countries to allow for cross-cultural comparisons. Finally, this study did not assess the coaches' nutritional knowledge, especially the knowledge related to WL. This limitation restricts the further interpretation of some findings. Future research should include this assessment to conduct a more in-depth exploration of the coaches' weight loss guidance.

5. Conclusion

Coaches are the primary drivers of pre-competition WL practices in CS, actively requiring athletes to reduce weight to compete in lower categories. While many coaches recognize potential health risks, a substantial proportion perceives WL as neutral or beneficial, and their recommendations are often based on personal experience rather than scientific evidence. Coaches' perceptions influence the risk level of methods they suggest, yet athletes only partially follow guidance, highlighting the role of entrenched cultural norms. These findings underscore the urgent need for evidence-based coach education, enhanced collaboration with nutritionists and medical staff, and certification standards that include weight-management knowledge.

Acknowledgments

The authors thank the participants for the time spent completing the questionnaire.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

No funding was received for this study.

ORCID

Yuming Zhong http://orcid.org/0009-0005-9672-8067
Yongming Li http://orcid.org/0000-0001-9654-0199

References

1. Zhong Y, Tang W, Weldon A, et al. Reevaluating the definition of rapid weight loss in sports: a call for change. J Int Soc Sports Nutr. 2025;22(1):2550312. doi: 10.1080/15502783.2025.2550312
2. Zhong Y, Song Y, Artioli GG, et al. The practice of weight loss in combat sports athletes: a systematic review. Nutrients. 2024;16(7):1050. doi: 10.3390/nu16071050
3. Zhong Y, Lakicevic N, Drid P, et al. Prevalence and patterns of pre-competition weight loss practices in Chinese amateur boxers. Int J Sports Sci Sci Coach. 2024;20(1):281–290. doi: 10.1177/17479541241295314
4. Kons RL, Da Silva Athayde MS, Follmer B, et al. Methods and magnitudes of rapid weight loss in judo athletes over pre-competition periods. Hum Movement. 2017;18(2):49–55. doi: 10.1515/humo-2017-0014
5. Hillier M, Sutton L, James L, et al. High prevalence and magnitude of rapid weight loss in mixed martial arts athletes. Int J Sport Nutr Exerc Metab. 2019;29(5):512–517. doi: 10.1123/ijsnem.2018-0393
6. Giannini Artioli G, Gualano B, Franchini E, et al. Prevalence, magnitude, and methods of rapid weight loss among judo competitors [article]. Med Sci in Sports Exercise. 2010;42(3):436–442. doi: 10.1249/MSS.0b013e3181ba8055
7. Franchini E, Brito CJ, Artioli GG. Weight loss in combat sports: physiological, psychological and performance effects. J Int Soc Sport Nutr. 2012 12 13;9(1):52. doi: 10.1186/1550-2783-9-52
8. Pettersson S, Ekström MP, Berg CM. Practices of weight regulation among elite athletes in combat sports: a matter of mental advantage? J Athl Train. 2013;48(1):99–108. doi: 10.4085/1062-6050-48.1.04
9. Reale R, Cox GR, Slater G, et al. Regain in body mass after weigh-in is linked to success in real life judo competition. Int J Sport Nutr Exerc Metab. 2016;26(6):525–530. doi: 10.1123/ijsnem.2015-0359
10. Coswig VS, Miarka B, Pires DA, et al. Weight regain, but not weight loss, is related to competitive success in real-life mixed martial arts competition [article]. Int J Sport Nutr Exerc Metab. 2019;29(1):1–8. doi: 10.1123/ijsnem.2018-0034
11. Baribeau V, Kirk C, Le DQ, et al. Rapid weight gain and weight differential predict competitive success in 2100 professional combat-sport athletes. Int J Sport Physiol Perform. 2023;18(1):85–94. doi: 10.1123/ijspp.2022-0204
12. Barley OR, Chapman DW, Abbiss CR. Weight loss strategies in combat sports and concerning habits in mixed martial arts. Int J Sport Physiol Perform. 2018;13(7):933–939. doi: 10.1123/ijspp.2017-0715
13. Degoutte F, Jouanel P, Bègue RJ, et al. Food restriction, performance, biochemical, psychological, and endocrine changes in judo athletes. Int J Sports Med. 2006;27(1):9–18. doi: 10.1055/s-2005-837505
14. Gann JJ, Tinsley GM, La Bounty PM. Weight cycling: prevalence, strategies, and effects on combat athletes. Strength Cond J. 2015;37(5):105–111. doi: 10.1519/SSC.0000000000000168
15. Štangar M, Štangar A, Shtyrba V, et al. Rapid weight loss among elite-level judo athletes: methods and nutrition in relation to competition performance. J Int Soc Sport Nutr. 2022 12 31;19(1):380–396. doi: 10.1080/15502783.2022.2099231
16. Pélissier L, Ennequin G, Bagot S, et al. Lightest weight-class athletes are at higher risk of weight regain: results from the French-rapid weight loss questionnaire. Phys sportsmed. 2023 ;51(2):144–152. doi: 10.1080/00913847.2021.2014285
17. Vasconcelos BB, Guedes JB, Del Vecchio FB. Prevalence, magnitude, and methods of rapid weight loss in national level Wushu Sanda athletes. Sci Sports. 2023 05 16;39(1):43–50. doi: 10.1016/j.scispo.2022.08.006
18. Zhong Y, Weldon A, Casado A, et al. Training-intensity distribution, volume, periodization, and performance in elite rowers: a systematic review. Int J Sport Physiol Perform. 2025;20(5):610–621. doi: 10.1123/ijspp.2024-0433

19. Zhong Y, Zheng H, Weldon A, et al. Training volume, intensity, and performance of world-class Chinese rowers prior to the 2019 world championships: a case study. Int J Sports Sci Sci Coach. 2024;17479541241279559. doi: 10.1177/17479541241279559
20. Marquart LF, Sobal J. Weight loss beliefs, practices and support systems for high school wrestlers. J Adolesc Health. 1994 07 01;15(5):410–415. doi: 10.1016/1054-139X(94)90266-6
21. Lakicevic N, Matthews JJ, Artioli GG, et al. Patterns of weight cycling in youth Olympic combat sports: a systematic review. J Eat Disord. 2022;10(1):75. doi: 10.1186/s40337-022-00595-w
22. Dunican IC, Galpin A, Turner M, et al. Sleep behaviors and nutritional knowledge in amateur and professional combat sport athletes. The J Strength & Cond Res. 2024;38(9):1627–1634. doi: 10.1519/JSC.0000000000004846
23. Berkovich BE, Stark AH, Eliakim A, et al. Rapid weight loss in competitive judo and taekwondo athletes: attitudes and practices of coaches and trainers. Int J Sport Nutr Exerc Metab. 2019;29(5):532–538. doi: 10.1123/ijsnem.2018-0367
24. von Elm E, Altman DG, Egger M, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. Int J Surg. 2014;12(12):1495–1499. doi: 10.1016/j.ijsu.2014.07.013
25. Zhong Y, Weldon A, Bishop C, et al. Practices of strength and conditioning coaches across Chinese high-performance sports. Int J Sports Sci Sci Coach. 2023;18(5):1442–1455. doi: 10.1177/17479541231176491
26. Drid P, Figlioli F, Lakicevic N, et al. Patterns of rapid weight loss in elite sambo athletes. BMC Sports Sci Med Rehabil. 2021;13(1):39. doi: 10.1186/s13102-021-00267-3
27. Artioli GG, Scagliusi F, Kashiwagura D, et al. Development, validity and reliability of a questionnaire designed to evaluate rapid weight loss patterns in judo players. Scand J Med Sci Sports. 2010;20(1):e177–87. doi: 10.1111/j.1600-0838.2009.00940.x
28. Dugonjić B, Krstulović S, Kuvačić G. Rapid weight loss practices in elite kickboxers. Int J Sport Nutr Exerc Metab. 2019;29(6):583–588. doi: 10.1123/ijsnem.2018-0400
29. Kons RL, Gheller RG, Costa FE, et al. Rapid weight loss in visually impaired judo athletes: prevalence, magnitude, and methods [article]. Brit J Vis Impair. 2022;40(2):255–263. doi: 10.1177/0264619620967697
30. Burke LM, Slater GJ, Matthews JJ, et al. Acsm expert consensus statement on weight loss in weight-category sports. Curr Sports Med Rep. 2021;20(4):199–217. doi: 10.1249/JSR.0000000000000831
31. Oppliger RA, Case HS, Horswill CA, et al. American College of Sports Medicine position stand. Weight loss in wrestlers. Med Sci in Sports Exercise. 1996;28(10):135–138. doi: 10.1097/00005768-199610000-00049
32. Artioli GG, Saunders B, Iglesias RT, et al. It is time to ban rapid weight loss from combat sports. Sports Med. 2016;46(11):1579–1584. doi: 10.1007/s40279-016-0541-x
33. Lakicevic N, Paoli A, Roklicer R, et al. Effects of rapid weight loss on kidney function in combat sport athletes [review]. Med lith. 2021;57(6):551. doi: 10.3390/medicina57060551
34. Mauricio CA, Merino P, Merlo R, et al. Rapid weight loss of up to five percent of the body mass in less than 7 days does not affect physical performance in official Olympic combat athletes with weight classes: a systematic review with meta-analysis. Front Physiol. 2022;13:830229. doi: 10.3389/fphys.2022.830229
35. Reljic D, Hässler E, Jost J, et al. Rapid weight loss and the body fluid balance and hemoglobin mass of elite amateur boxers. J Athl train. 2013;48(1):109–117. doi: 10.4085/1062-6050-48.1.05
36. Cheuvront SN, Kenefick RW. Dehydration: physiology, assessment, and performance effects. Compr Physiol. 2014 Jan;4(1):257–285. doi: 10.1002/j.2040-4603.2014.tb00543.x
37. Sawka MN, Latzka WA, Matott RP, et al. Hydration effects on temperature regulation. Int J Sports Med. 1998 Jun;19(S 2):S108–10. doi: 10.1055/s-2007-971971
38. González-Alonso J, Mora-Rodríguez R, Below PR, et al. Dehydration markedly impairs cardiovascular function in hyperthermic endurance athletes during exercise. J Appl Physiol. 1997;82(4):1229–1236. doi: 10.1152/jappl.1997.82.4.1229
39. Fortes LdSL, H.A.A.d.S., Ferreira MEC. Effect of rapid weight loss on decision-making performance in judo athletes. J Phys Educ. 2017;28(e2817).
40. Roklicer R, Rossi C, Bianco A, et al. Rapid weight loss coupled with sport-specific training impairs heart rate recovery in Greco-Roman wrestlers. Appl Sci. 2022;12(7):3286. doi: 10.3390/app12073286
41. de Sousa Fortes L, de Vasconcelos GC, de Vasconcelos Costa BD, et al. Effect of 10% weight loss on simulated taekwondo match performance: a randomized trial. J Exerc Rehabil. 2017;13(6):659–665. doi: 10.12965/jer.1735134.567
42. Liu Y, Evans J, Wąsik J, et al. Performance alteration induced by weight cutting in mixed martial arts—a biomechanical pilot investigation. Int J Environ Res Public Health. 2022;19(4):2015. doi: 10.3390/ijerph19042015
43. Barley OR, Iredale F, Chapman DW, et al. Repeat effort performance is reduced 24 hours after acute dehydration in mixed martial arts athletes. J Strength Cond Res. 2018;32(9):2555–2561. doi: 10.1519/JSC.0000000000002249
44. Doherty CS, Fortington LV, Barley OR. Prevalence of disordered eating and its relationship with rapid weight loss amongst male and female combat sport competitors: a prospective study. J Sci Med Sport. 2024;27(11):745–752. doi: 10.1016/j.jsams.2024.06.007
45. Zhong Y, Langan-Evans C, Weldon A, et al. Weight loss practices, perceptions, and eating disorders among Chinese female adolescent combat sports athletes. Int J Sports Sci Sci Coach. 2025.

46. Fcwbmondcd T. No relationship between nutritional knowledge and rapid weight loss in male amateur boxers. The J Sport and Exercise Sci. 2021;5(5):339–346.
47. Smith KA, Naughton RJ, Langan-Evans C, et al. "Horrible-but worth it": exploring weight cutting practices, eating behaviors, and experiences of competitive female taekwon-do athletes. A mixed methods study. J Clin Sport Psychol. 2024;18(1):150–164. doi: 10.1123/jcsp.2021-0103
48. Sansone RA, Sawyer R. Weight loss pressure on a 5 year old wrestler. Br J Sports Med. 2005;39(1):e2–e2. doi: 10.1136/bjsm.2004.013136
49. Altınok Ö, Baş M. Coach candidates' and coaches' nutrition knowledge affects dietary recommendations indirectly: Mediator effects of self-efficacy. Nutrients. 2025;17(3):589. doi: 10.3390/nu17030589
50. Danaher K, Curley T. Nutrition knowledge and practices of varsity coaches at a Canadian university. Can J Diet Pract Res. 2014;75(4):210–213. doi: 10.3148/cjdpr-2014-021
51. Couture S, Lamarche B, Morissette E, et al. Evaluation of sports nutrition knowledge and recommendations among high school coaches. Int J Sport Nutr Exerc Metab. 2015;25(4):326–334. doi: 10.1123/ijsnem.2014-0195
52. Meng F, Zhong Y, Zhang Z, et al. Victory above all: the weight loss practices and perceptions of Chinese male kickboxers. Peer J. 2025.
53. Berkovich B-E, Eliakim A, Nemet D, et al. Rapid weight loss among adolescents participating in competitive judo [article]. Int J Sport Nutr Exerc Metab. 2016;26(3):276–284. doi: 10.1123/ijsnem.2015-0196
54. da Silva Santos JF, Takito MY, Artioli GG, et al. Weight loss practices in taekwondo athletes of different competitive levels. J Exerc Rehabil. 2016;12(3):202–208. doi: 10.12965/jer.1632610.305
55. Malliaropoulos N, Rachid S, Korakakis V, et al. Prevalence, techniques and knowledge of rapid weight loss amongst adult British judo athletes: a questionnaire based study. Muscles Ligaments Tendons J. 2018;7(3):459–466. doi: 10.32098/mltj.03.2017.08
56. Ranisavljev M, Kuzmanovic J, Todorovic N, et al. Rapid weight loss practices in grapplers competing in combat sports. Front Physiol. 2022;13:842992. doi: 10.3389/fphys.2022.842992
57. Santos-Junior RB, Utter AC, McAnulty SR, et al. Weight loss behaviors in Brazilian mixed martial arts athletes [article]. Sport Sci Health. 2020;16(1):117–122. doi: 10.1007/s11332-019-00581-x
58. Todorović N, Ranisavljev M, Tapavički B, et al. Principles of rapid weight loss in female Sambo athletes. Int J Environ Res Public Health. 2021;18(21):11356. doi: 10.3390/ijerph182111356
59. White T, Kirk C. Pre-competition body mass loss characteristics of Brazilian jiu-jitsu competitors in the United Kingdom. Nutr Health. 2021;27(4):387–394. doi: 10.1177/0260106020983800
60. Zhong Y, Tang W, Gee TI, et al. Weight loss practices in Chinese national and international-level Sanda athletes. J Int Soc Sports Nutr. 2025;22(1):2551216. doi: 10.1080/15502783.2025.2551216
61. Amatori S, Barley OR, Gobbi E, et al. Factors influencing weight loss practices in Italian boxers: a cluster analysis. Int J Environ Res Public Health. 2020;17(23):8727. doi: 10.3390/ijerph17238727
62. Boisseau N. Consequences of sport-imposed weight restriction in childhood. Ann Nestlé [Engl]. 2006;64(2):77–84. doi: 10.1159/000093014
63. Lakicevic N, Reale R, D'Antona G, et al. Disturbing weight cutting behaviors in young combat sports athletes: a cause for concern [opinion]. Front Nutr. 2022;9:9–2022. doi: 10.3389/fnut.2022.842262
64. Roemmich JN, Sinning WE. Weight loss and wrestling training: effects on growth-related hormones. J Appl Physiol (1985). 1997;82(6):1760–1764. doi: 10.1152/jappl.1997.82.6.1760
65. Georgopoulos N, Markou K, Theodoropoulou A, et al. Growth and pubertal development in elite female rhythmic gymnasts. J Clin Endocrinol Metab. 1999;84(12):4525–4530. doi: 10.1210/jcem.84.12.6177
66. Theintz GE, Howald H, Weiss U, et al. Evidence for a reduction of growth potential in adolescent female gymnasts. J Pediatr. 1993;122(2):306–313. doi: 10.1016/S0022-3476(06)80139-3
67. Yoshida E, Hayashida H, Sakurai T, et al. Evidence of weight loss in junior female judo athletes affects their development. Front Sports Act living. 2024;6:1420856. doi: 10.3389/fspor.2024.1420856
68. OAoSo C. National primary sports coach post training examination outline. 2024 Available from: https://www.sport.gov.cn/kjs/n5076/c28112927/part/28112960.pdf
69. Alderman BL, Landers DM, Carlson J, et al. Factors related to rapid weight loss practices among international-style wrestlers. Med Sci in Sports Exercise. 2004;36(2):249–252. doi: 10.1249/01.MSS.0000113668.03443.66
70. China SaEDotGAoSo. Notice from the Science and Education Department of the General Administration of Sport of China regarding the 2020 national primary coach training examination. 2020 Available from: https://www.sport.gov.cn/n315/n20001395/c20009392/content.html#:~:text
71. Langan-Evans C, Germaine M, Artukovic M, et al. The psychological and physiological consequences of low energy availability in a male combat sport athlete. Med Sci in Sports Exercise. 2021;53(4):673–683. doi: 10.1249/MSS.0000000000002519
72. Park J-H, Yoon J, Yun H-J, et al. The impact of sauna suits on body fluid loss, body temperature, and energy expenditure in athletes. Text Res J. 2025;00405175241294100. doi: 10.1177/00405175241294100