Weight Loss Practices, Perceptions, and Eating Disorders Among Chinese Female Adolescent Combat Sports Athletes

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Abstract

This study investigated the weight loss (WL) practices, perceptions, and eating disorders (ED) symptoms of Chinese female adolescent combat sport (CS) athletes. An adapted Rapid WL Questionnaire (RWLQ) and Eating Disorder Examination-Questionnaire 8 (EDE-Q8) were completed during the off-season of female adolescent CS athletes to provide WL practices, perceptions, and global ED score. There were 130 and 78 respondents for the adapted RWLQ and EDE-Q8, respectively. Seventy-three percent of participants purposefully engaged in WL practices. The average habitual WL was 8.0% of body mass (BM), and the highest WL was 9.1% of BM. Participants predominantly allocated 15+ days before the weigh-in for WL (65%). Coaches were most commonly reported as the primary guides for WL (64%). Athletes engage in WL mainly to compete against lighter opponents (65%). Most participants perceived that WL had no impact on health (51%), is beneficial to performance (52%), and does not lead to unfair competition (79%). Only six percent of participants were considered as having ED symptoms. No significant differences and association in global ED scores and ED symptoms were observed across any examined dependent variables. The prevalence and magnitude of WL are high amongst Chinese female adolescent CS athletes. Most athletes adopted long-term strategies to lose a substantial percentage of their BM. Athletes' WL practices did not differ according to their perceptions regarding the impact of WL on performance, health, or fairness. Off-season prevalence of ED symptoms and global ED score showed no significant differences or associations with athletes' habitual WL behaviors.

Key words: dehydration, disordered eating, weight management, weight cutting, body mass loss

Background

Combat sports (CS) encompass a range of Olympic (e.g., judo, wrestling, taekwondo) and non-Olympic (e.g., professional boxing, sambo, mixed martial arts) disciplines, many of which have long-standing histories and are pursued by large numbers of participants worldwide. To ensure fair competition, CS matches are organized by weight classes, and athletes who fail to meet the required body mass (BM) may, depending on the specific competition rules and organizer discretion, be disqualified or required to compete in a higher weight class.[1] Under these regulations, many athletes engage in pre-competition weight loss (WL)[2] in an attempt to maximize their chances of victory or to gain a perceived advantage, such as facing a physically smaller opponent.[3-5] Despite evidence that WL can negatively affect athletes' health and performance,[1, 6-8] and has even been linked to athlete fatalities,[9] a substantial gap remains between research findings and actual practice, as many athletes continue to rely on WL strategies.[4, 10, 11]

Extensive research has examied the WL practices of CS athletes across various sports, such as judo, mixed-martial arts (MMA), and sambo, in multiple countries (e.g., Brazil, France, and Australia) and at different competitive levels (e.g., high school, university, and elite).[12-32] A recent systematic review summarized the similarities and differences in the WL practices of CS athletes from different backgrounds, including sport, country, and competitive level.[33] Common findings in the literature include that CS athletes frequently engage in WL (prevalence of 66–100%) regardless of demographic background (i.e. sex, nationality, competitive level, sport discipline), that increased exercise and gradual dieting are the most widely WL methods, and that athletes typically lose 2–5% of BM within 7–14 days before competition.[33] Significant differences in the WL practices (such as WL percentage of BM [WL%]) have also been reported, with both habitual and highest WL% among MMA, Muay Thai, and sambo athletes being significantly higher than athletes in other sports (e.g., boxing, sanda, and judo).[33]

Although previous studies have provided important insights into WL practices among CS athletes, existing literature has largely focused on male-only samples or mixed-gender cohorts.[10-32, 34-40] Only a few studies have specifically examined female CS athletes.[5, 41-43] Research in mixed samples can describe WL practices among female athletes and explore sex differences, when sex-disaggregated data are reported, which is rarely the case.[11, 24, 28, 36, 44-46] However, such studies cannot provide detailed analyses within the female athlete group—for example, whether WL practices differ by competition level or weight class in female athletes. Therefore, dedicated investigations of WL practices among female CS athletes are essential to better understand the factors influencing their WL practices. Moreover, current research investigating female CS athletes has primarily focused on adult populations,[5, 11, 24, 28, 36, 41-46] whereas studies involving female adolescent athletes remain scarce.[24, 42, 44-46] Adolescence is a critical stage for athletes' long-term growth and development.[47, 48] Evidence suggests that WL practices may negatively affect the growth and development of young female combat sport athletes.[49, 50] During adolescence, high training loads combined with low energy availability can impair bone growth and limit increases in height.[51-53] Additionally, prolonged energy restriction may reduce basal metabolic rate and increase the risk of future obesity,[6, 54] thereby further compromising physical development and overall health.

Alongside the importance of adequate nutritional intake for healthy growth, well-being, and development, adolescence is a critical period in which relationships with food and nutritional behaviors are formed and can persist into adulthood.[55] It has been suggested that if WL and subsequent weight regain (WR) are repeated throughout the careers of CS athletes, consequences of such behavior can transition from short-term to long-term, placing athletes at greater risk of developing disordered eating (DE) and eating disorders (ED).[50] Female adolescent athletes are particularly vulnerable to ED, as this group exhibits the highest prevalence,[56] especially in aesthetic and weight-class sports. Notably, a high prevalence (approximately 30%) of DE and ED has been reported among female athletes competing in weight-sensitive sports such as CS.[57, 58]

The hormonal and metabolic dysregulation of DE can impair athletic performance in various ways. Reductions in estrogen and testosterone levels hinder the development and maintenance of muscle mass,[59, 60] while reductions in Insulin-like Growth Factor 1 (IGF-1) and growth hormone compromise bone development and elevate fracture risk.[59-61] Empirical evidence suggests that competing in CS may increase the risk of ED, as athletes often engage in unhealthy and extreme weight control strategies.[33] Although previous research have investigated DE or ED symptoms in CS athletes, the majority has focused on adults or female athletes,[62-69] with only two studies specifically targeting adolescent CS athletes.[67, 68] Several investigations have also explored ED symptoms in adolescent females from other sports.[70-76] understanding the prevalence and characteristics of ED symptoms in female adolescent CS athletes remains essential. Furthermore, no study to date has analyzed the relationship between athletes' habitual WL practices and ED symptoms during the off-season, despite the possibility that such practices are a major contributing factor to ED development.[50] Importantly, ED symptoms observed in the off-season may reflect the chronic, rather than acute, effects of WL.

Given the limited understanding of the WL practices, perceptions, and ED symptoms among female adolescent CS athletes, further investigation is warranted to provide valuable insights into this underexplored population. Therefore, the present study aimed to examine the WL practices and perceptions, as well as to collect data on ED symptoms, among female adolescent CS athletes in China.

Materials & Methods

Experimental approach to the problem

This study employed an observational cross-sectional design, using a questionnaire to assess WL practices and perceptions, as well as to collect data on ED symptoms among Chinese female adolescent CS athletes during the off-season. A mixed non-probability sampling strategy was adopted to target the relevant population, combining purposive and convenience sampling. The study followed the cross-sectional reporting guidelines outlined by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[77] to ensure transparency and consistency in observational research practices.

Participants

Participants were recruited through multiple channels. For online recruitment, a questionnaire link was sent to CS team managers via social media (WeChat, Tencent, China), with a request that the content be shared with their athletes,[44, 78, 79] Paper-based questionnaires were distributed in person at the largest training base for CS athletes in China, with team managers assisting in recruitment during daily team meetings. All athletes who consented to participate in the offline survey were assembled in a conference room to complete the questionnaire.[24] Prior to the application of the questionnaire, participants received an oral briefing for the offline version, while written information was provided for the online survey before obtaining informed consent. Informed consent was also obtained from the participants and their parents or guardians before the survey session. The inclusion criteria were: (i) consent to participate in the study, (ii) participation in at least one official CS competition within the past 12 months, (iii) currently training as a female CS athlete on a sports team, and (iv) age 12-17 years. A total of 136 participants completed the questionnaire. The lead author (YMZ) pre-screened all responses, and six responses were excluded based on criterion (ii), resulting in 130 responses included in the analysis. Among these, 130 and 78 participants completed the adapted RWLQ and EDE-Q8, respectively. Participants were categorized by competitive levels (*local, provincial, national, international*), sports discipline (*boxing, sanda, taekwondo wrestling, judo*), whether their coach guided their WL processes (*yes/no*), attitude toward impact of WL on health (*no impact, detrimental, beneficial*), attitude toward impact of WL on performance (*no impact, detrimental, beneficial*), attitude toward impact of WL on fairness (*no impact, leads to unfair competition, unsure*), and whether athletes were classified as having an ED (*global ED score ≥4.0*).[80, 81] Approval for conducting the study was secured from the Ethics Committee of the Shanghai University of Sport (number of approval: 102772023RT170).

Questionnaire Development and Administration

The WJX web platform (WENJUANXING, www.wjx.cn) was used to construct, distribute, and collect all online questionnaire responses.[78, 82] Responses from paper questionnaires were manually entered into the WJX platform by the lead author (YMZ). For, WL practices and perceptions, this study employed the adapted RWLQ by Meng et al.[83] The questionnaire consisted of 30 questions and featured four sections: (i) general information, (ii) competition experience, (iii) WL history, and (iv) WL perception. The section on WL history and perception was only available for those who had engaged in WL.

For ED symptom assessment, the ED Examination-Questionnaire 8 (EDE-Q8) was used, a short version of the EDE–Q for measuring ED psychopathology in the past four weeks. Eight items are rated on a seven-point scale ranging from 0 (*no days/not at all*) to 6 (*every day/markedly*), yielding four subscale scores assessing restraint, shape concern, weight concern, and eating concern. The global ED score represents an average of the four subscale scores, with higher scores indicating greater eating pathology. ED status was identified by an global ED score $\geq$ 4.0, consistent with the EDE-Q norms for patients with clinical eating disorders, and reporting one or more pathologic behaviors including self-induced vomiting, use of laxatives, diuretics, binge eating, on $\geq$2 days in the past 28 days.[80, 81] Only participants who had engaged in WL were invited to complete the EDE-Q8.

The content validity of the Chinese version of the EDE-Q8 was evaluated by an author (JQQ) with extensive experience in ED research, and ten female adolescent CS athletes through pilot tests. The researchers helped check the wording of the questionnaire to ensure accuracy, and the athletes provided feedback on items they did not understand or suggested adjustments. Pilot testing resulted in minor modifications in the wording of certain questions to ensure clarity and relevance for female adolescent CS athletes. Data collection occurred from November 15, 2024 to January 12, 2025.

Statistical analyses

All analyses were conducted using SPSS 27.0 (IBM Corp., Armonk, NY). Descriptive statistics were used to summarize all results. Continuous variables are presented as both median (interquartile range, IQR) and mean (± standard deviation, SD), while categorical variables are presented as frequencies (%). The Shapiro-Wilk test was applied to assess normality. All continuous variables violated parametric assumptions of normality. The inferential statistics analysis used in this study is presented in Table 1.

For comparisons of global ED scores across different CS disciplines, judo athletes (n=2) were excluded due to the very small sample size, which would compromise the reliability of subgroup analyses. Statistical significance was set at $p < 0.05$. Bonferroni corrections were used to adjust for inflated Type I error rates due to multiple comparisons.

In this study, only the general information, highest WL%, habitual WL%, number of WL in the last year, WR% after weigh-ins, WR/WL ratio, perceptions of the impact of WL, WR% after competitions, age began WL, global ED score, and ED symptom were analyzed using inferential statistics, as these variables are most directly related to our primary research questions and exhibit logical relationships. The formulas used to calculate WL experience, WR% after competition, and WR/WL ratio are as follows:

WL experience = current age − age began WL

WR% after competition = WR (kg) after the competition / (habitual BM − habitual WL [kg] + habitual WR between weigh-ins and competitions [kg])

WR/WL ratio = habitual WR between weigh-ins and competitions [kg] / habitual WL [kg]

The frequencies of responses indicating 'always' and 'sometimes' for WL methods were combined to describe the participants' primary WL methods, as both represent current use. The influence score (IS) of different sources was calculated using the formula from a previous systematic review[33]:

*IS = (percentage of sample who select "Not influential" *1 + percentage of sample who select "A little influential" *2+ percentage of sample who select "Unsure" *3+ percentage of sample who select "Somewhat influential" *4 + percentage of sample who select "Very influential" *5) *100.*

INSERT TABLE 1 ABOUT HERE

Results

The general information of the participants is presented in Table 2. No significant differences were observed in general information variables ($p>0.05$) between participants who engaged in WL and those who never engaged in WL. All participants reported being in their off-season at the time of data collection. Overall, 73% of participants (n=95, 11 local level, 38 provincial level, 46 national level) reported intentionally engaging in WL for competition, and 53% indicated that they had not changed their weight category within the past two years. Among the 78 participants who completed the EDE-Q8, 6% were classified as presenting ED symptoms (global ED score $\geq$ 4.0).

The results of the participants' WL history and global ED score are presented in Table 3. Kruskal–Wallis tests revealed significant age differences in: the age began WL practices across sports disciplines ($p=0.020$), the highest WL% across competitive levels ($p=0.044$), and the number of WL cycles last year across sports disciplines ($p=0.022$).

Spearman's rank correlation analyses further demonstrated significant relationships. Specifically: the number of WL cycles last year was positively correlated with both WL experience ($\rho=0.340$, $p=0.017$) (see figure 1A) and the number of competitions participated last year ($\rho=0.576$, $p=0.017$) (see figure 1B). Habitual WL% was positively correlated with WR% after competition ($\rho=0.360$, $p=0.017$) (see figure 1C), but negatively correlated with the WR/WL ratio ($\rho=-0.480$, $p=0.017$) (see figure 1D).

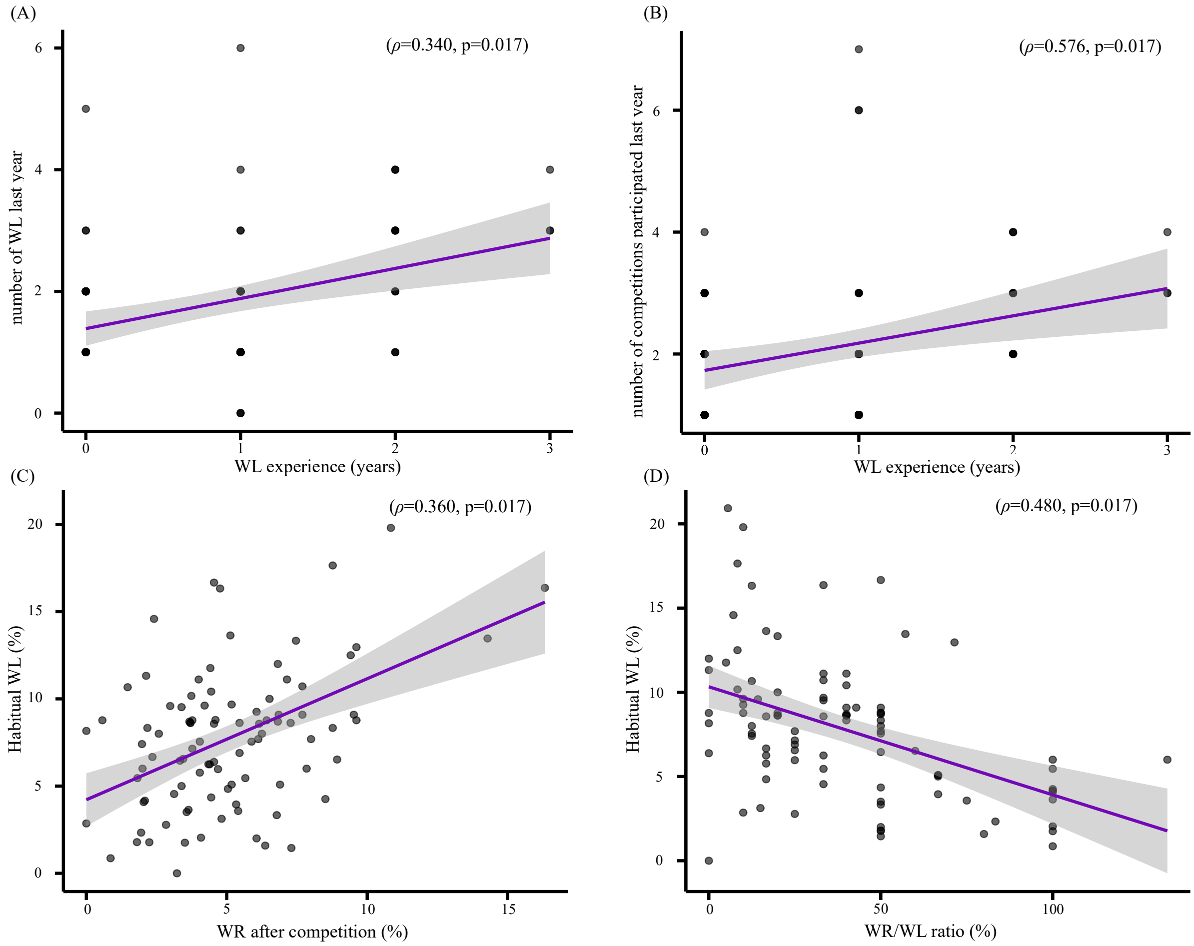

Figure 1. Spearman's rank correlations between weight loss-related variables in female adolescent combat sport athletes.

Note: WL, weight loss; WR, weight regain; (A) Number of WL last year vs. WL experience. (B) Number of WL last year vs. number of competitions participated last year. (C) WR percentage after competition vs. habitual WL percentage. (D) WR/WL ratio vs. habitual WL percentage.

The results of all inferential statistical analyses are presented in Table 1. Post-hoc tests indicated that the age when WL practices began was significantly higher among sanda athletes compared with taekwondo athletes ($p<0.001$). National-level athletes demonstrated a significantly greater highest WL% compared with local-level athletes ($p=0.001$). Furthermore, the number of WL cycles in the last year was significantly higher in judo ($p=0.047$) and taekwondo ($p=0.003$) compared with sanda athletes.

The majority of participants reported allocating 15+ days before the weigh-in for WL (65%), followed by 11-14 days (15%), 8-10 days (12%), 6-7 days (5%), 1-3 days (2%), and 4-5 days (1%). Most participants achieved 61–80% of their total planned magnitude of WL between 60 and 9 days prior to weigh-in (32.6%), 0–20% between 8 and 1 day prior to weigh-in (41.1%), and 0–20% within 1 day prior to weigh-in (73.7%) (see figure 2 and 3).

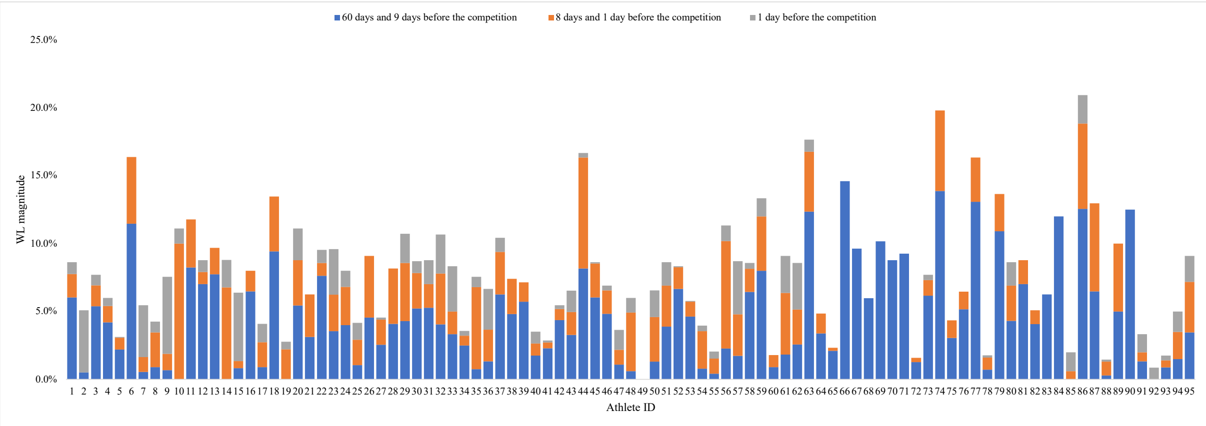

Figure 2. The weight loss% of Chinese female adolescent combat sport athletes at different stages (n=95).

Note: WL, weight loss; Athlete 49 usually do not reduce body mass (0 kg), therefore no data in this figure.

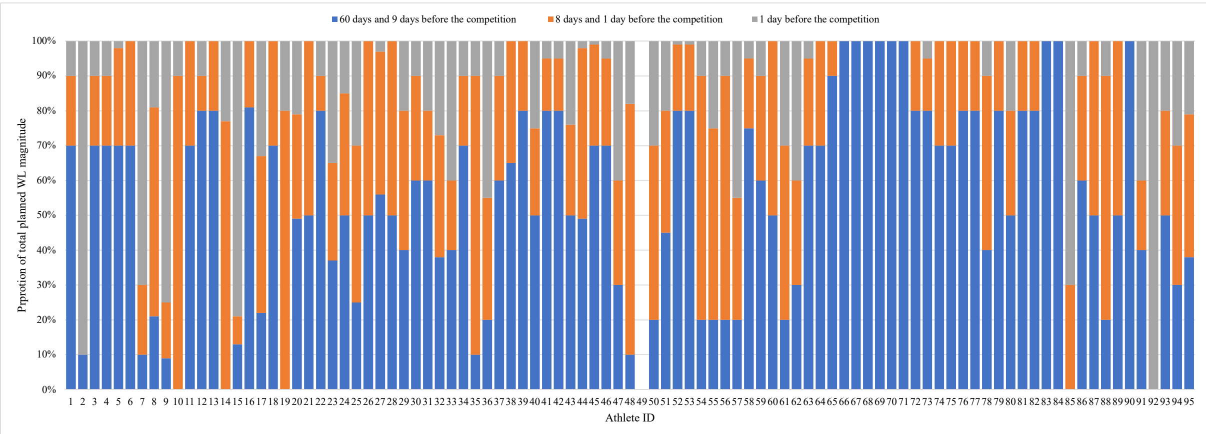

Figure 3. The proportion of total weight loss of Chinese female adolescent combat sport athletes at different stages (n=95).

Note: WL, weight loss; Athlete 49 usually do not reduce body mass (0 kg), therefore no data in this figure.

Coaches (64%) were most frequently identified as the primary guides for WL, followed by self-guidance (62%), strength and conditioning coach (8%), parent (4%), nutritionist (3%), and doctor (2%). The primary reason reported for engaging in WL was to compete against lighter opponents to increase the chances of winning (65%), followed by optimizing athletic performance (61%), being above usual weight before a competition (44%), “my coach told me to lose weight, so I have to do it" (7%), and "because everyone else is cutting weight, so I have to do it too" (6%). Most participants perceived that WL had no impact on health (51%), whereas 27% perceived it as beneficial and 22% as detrimental. Similarly, a majority perceived WL as beneficial to performance (52%), followed by 33% who reported no impact and 16% who considered it detrimental. Regarding fairness, most participants indicated that WL did not lead to unfair competition (79%), whereas 19% were uncertain and 3% perceived it as unfair.

The WL methods used by athletes are shown in Table 4, and the influence of different sources on WL practices is shown in Table 5.

INSERT TABLE 2-5 ABOUT HERE

Discussion

This study investigated the WL practices, perceptions, and ED symptoms of Chinese female adolescent CS athletes. The primary findings include: (i) the primary reported reason for engaging in WL was to compete against lighter opponents in order to increase the chances of winning; and (ii) most athletes perceived WL as having no impact on health, as beneficial for performance, and as not contributing to unfair competition. and (iii) the off-season prevalence of ED symptoms and global ED score showed no significant differences or associations with habitual WL behaviors.

In this study, 73% of participants reported purposefully engaging in WL practices, which is lower than previous findings in female CS athletes from MMA (100%),[28] taekwondo (73-89%),[5, 23] sambo (88.7%),[42] and mixed-sports samples (81.3-89%),[20, 46] but higher than that reported in boxing (62%).[44] The relatively lower prevalence of WL in this study may be attributable to the fact that participants were adolescent athletes, who typically exhibit lower WL prevalence than adult,[27, 33, 44] and to the smaller weight category increments for adolescents, which reduce the incentive for extreme WL.

The average habitual WL of participants was 7.8% of BM (Table 3), higher than previous findings in female CS athletes in wrestling (4.8%),[36] sanda (5.1-6.4%),[11, 84] sambo (5.6%),.[24] taekwondo (2.2-6.8%),[45] boxing (5.5%),[44] and mixed-sports study (4.1%),[46] but comparable to those observed in MMA (7.2-8.6%).[28] In this study, the highest WL recorded among athletes was 10.3% of BM, higher than values reported in sanda (9.2-9.6%)[11, 84] and boxing (8.1%)[44]. These results suggest that the habitual and highest WL% of female adolescent CS athletes in the present study were exceptionally high, with habitual WL% resembling that observed in MMA athletes. However, MMA regulations allow sufficient recovery time (generally 24-36 hours) after weigh-ins, with athletes weighed only once.[85, 86] In contrast, boxing, sanda, and wrestling require athletes to weigh in on the morning of each competition day. Taekwondo and judo conduct official weigh-ins on the evening before the weigh-in; however, random weigh-ins are performed on the morning of competition, forcing athletes to maintain their BM within the designated range. This limits the extent of post-weigh-in recovery and continues to challenge to athletes' physical readiness on competition day.[87] Notably, most habitual WL (4.6%) was achieved during 60 to 9 days before weigh-in, with only a smaller proportion of WL during 8 to 2 days before weigh-in (2.3%) and on the 1 day prior to weigh-in (0.9%) (see figure 2 and 3). Consistent with this pattern, 65% of participants reported allocating 15+ days before the weigh-in for WL, a proportion considerably higher than that reported in other studies (13-31%).[27, 29, 40, 88] Although distributing WL over a longer period may mitigate the acute risks associated with rapid short-term WL in adult athletes,[89-91] the substantial total BM lost — particularly for 12- to 17-year-old athletes — could still pose serious health risks, such as impaired bone growth and hindered height development, as noted in the introduction. In the present study, the highest WL% was greater in national-level athletes (11.7%) compared with local-level athletes (6.7%). This may reflect the heightened competitiveness of national events, where athletes experience greater pressure to gain a competitive edge by reducing a significant amount of BM in certain competitions, or to the fact that national-level athletes typically possess more extensive WL experience.

On average, athletes regained 2.8% of BM (39.3% of the reduced BM) between weigh-ins and competitions. Most athletes did not fully regain their BM to habitual levels, likely due to the requirement of repeated weigh-ins across competition days. These regulations restrict opportunities for adequate rehydration and recovery, maintaining athletes in a state of prolonged depletion and dehydration throughout the competition period. Consequently, athletes were required to balance optimal performance needs with the demands of subsequent weigh-ins. However, a few athletes regained their BM to habitual levels or even exceeded it after weigh-ins. Further analysis revealed a significant negative correlation between habitual WL% and WR/WL ratio, indicating that athletes who lost smaller BM% tended to regain a higher percentage of it before the weigh-in. This is likely because smaller reductions are easier to restore within a short recovery window. On average, athletes regained 4.5% of BM within one week after competition, with a significant positive correlation observed between habitual WL% and WR% after the competition. This pattern is expected, as most athletes tended to return to their habitual BM during the week following competition; thus, athletes who lost more WL% also regained more. Repeated high-magnitude WL followed by substantial WR reflects a classic weight-cycling pattern among adolescent combat athletes, which Lakicevic et al.[50] identified as highly prevalent (25–94%) and involving risky methods such as dehydration and impermeable suits. This cyclical behavior not only reinforces unhealthy weight fluctuations but may also impair growth, endocrine balance, and bone development.

The average age at which athletes began WL practices in the present study was 14.4 years, comparable to previous findings in female CS athletes from sambo (14.2–15.5 years old)[24, 42] but younger than reported in taekwondo (16.2-22.5 years old),[23] wrestling (15.9 years old),[36] boxing (15.1 years old),[44] and sanda (17.3-19.8 years old).[11, 84] These results suggest that Chinese female adolescent athletes tend to begin WL earlier than most CS athletes from other countries and disciplines. In this study, most athletes reported engaging in WL during the same year they began competing, a finding consistent with previous research on Chinese boxing and sanda athletes.[44, 84] In contrast, a recent review noted that CS athletes from other countries typically delay the initiation of WL until several years after starting competition.[33] This indicates that, in China, WL practices are commonly adopted at the onset of competitive participation, regardless of age or sex. Furthermore, the present study found that sanda athletes began WL at a significantly younger than taekwondo athletes. This discrepancy may reflect differences in competitive level rather than sports discipline. Specifically, 84% of sanda athletes in this sample competed at the national-level athletes, compared with only 22% of taekwondo athletes. Thus, the potential influence of competitive level on the age at which WL practices began should not be overlooked. This interpretation is consistent with prior research on female athletes,[23] which reported that athletes at higher competitive levels tend to start WL earlier in their careers.

The most commonly reported WL methods were increasing exercise (82%), training in plastic suits (70%), skipping meals (61%), restricting fluid intake (59%), and gradual dieting (54%) (Table 4). These findings are partially consistent with previously reported practices among female athletes.[23, 24, 42, 44, 46] Specifically, the first four methods were consistently reported at higher usage rates than other methods, likely because they are more accessible and easier to implement than alternatives such as advanced equipment or pharmacological aids.[44] However, an inconsistency emerged regarding gradual dieting, which has typically been reported as the most frequently used method in other studies,[24, 42, 44, 46] except for one on taekwondo athletes.[23] In contrast, it ranked only fifth in the present study, suggesting that athletes relied more heavily on increasing training volume, often in combination with the use of plastic suits, to achieve WL goals. Given that coaches and athletes themselves were identified as the primary figures guiding WL practices, this reliance on exercise-based methods is understandable, as it does not require specific nutritional expertise and falls within the familiar areas of coaches and athletes. Consistently, previous research on Chinese boxers and sanda athletes also highlighted a preference for increased exercise and training in plastic suits.[44, 84] A recent study further demonstrated that wearing plastic suits can effectively induce BM loss during training,[92] which is particularly important during the pre-competition phase when athletes often reduce their overall training volume while increasing training intensity.[93, 94] In such contexts, plastic suits enable athletes to achieve additional BM reduction without substantially raising training volume.[44] In other words, plastic suits provide a means of achieving further BM reduction with the same training volume. Emphasizing WL through increased exercise rather than dietary restriction has implications for adolescent female athletes, who are in a critical stage of growth and development and require adequate nutrient intake.[47] Nonetheless, because the goal of WL inherently involves reducing BM, increased exercise inevitably induces an energy deficit, which can negatively affect adolescent health, including impairments in growth, bone development, and menstrual function.[95] Despite this, it is concerning that harmful practices continue to be used—or even consistently employed—by some athletes, albeit at lower prevalence rates.

Consistent with previous findings,[33] sports coaches were considered to have the highest impact on athletes' WL practices (Table 5). Interestingly, parents were identified as the second most influential figure on athletes' WL practices, a finding consistent with only a few studies involving adolescent athletes.[18, 20, 24, 44] One possible explanation is that adolescents are generally more susceptible to parental influence. However, it is important to clarify that 'influence' can occur through various forms, such as direct instruction, indirect encouragement, expressed expectations, or behavioral modeling. In addition to identifying the perceived influence of different roles on athletes' WL practices, the present study also determined who was responsible for guiding WL practices. This distinction is important for understanding whether the influence exerted by different roles was through direct instruction or other indirect means. The findings revealed that only the influence of coaches was directly associated with the WL process, while parental influence appeared to be exerted through other channels. This may include concerns about athletes' health or a focus on competitive outcomes. For example, parental influence may stem from their expectations rather than direct guidance on WL methods. When parents prioritize competitive success, adolescents may adopt more aggressive WL practices, contributing to higher WL%.[96, 97]

Findings from this study indicate that coaches were typically the primary figures guiding athletes in WL practices (64%), followed by self-guidance (62%). This aligns with previous research showing that most coaches guided the WL processes of their athletes.[98] Notably, only three athletes reported receiving guidance from nutritionist, and only two from doctor during their usual WL process. This is concerning, as coaches often lack sufficient knowledge of nutrition and physiology,[99, 100] and their primary sources of information are frequently social media or peer discussions.[101, 102] Such reliance makes it difficult for them to make evidence-informed decisions, a limitation that may be particularly pronounced when male coaches are responsible for female athletes. Previous studies have shown that many coaches, especially males, have limited awareness of female-specific health concerns such as the Female Athlete Triad, which further constrains their ability to effectively support female athletes.[103, 104] Even more troubling, 28% of athletes reported receiving no guidance at all, relying solely on themselves to achieve WL. Considering the high WL% observed in this study, especially among female adolescent athletes who are still in a critical stage of growth and development, this finding raises serious concerns. If coaches cannot provide safe and appropriate WL strategies, they should at minimum leverage their influence to discourage athletes from engaging in risky WL practices. While WL might be acceptable if conducted safely under professional supervision, reliance on coaches' personal experience and subjective judgment alone to is problematic and insufficient. Instead, coaches should advocate for the involvement of qualified nutritionists or medical professionals to ensure that athletes manage WL in a safe and effective manner. The absence of professional guidance and the limited involvement of nutritionists and doctors in WL practices appears to be a widespread issue,[33, 105] even within national-level teams. This is partly due to the limited nutrition and health science knowledge among both coaches and athletes[99, 100, 106, 107] and partly because many teams lack sufficient financial resources to employ multiple nutritionists or doctors, particularly given that a single team may consist of 20 to 50 athletes.[44]

The primary reason athletes engage in WL was to compete against lighter opponents in order to increase their chances of winning (65%). This finding is consistent with previous research, which reported that while most athletes consider the WL process to be highly unpleasant, they are nonetheless willing to endure it to secure a competitive advantage within their weight category.[5] in addition, optimizing athletic performance was identified as another major reason for WL, reflecting athletes' belief that WL can optimize performance, such as improving punching velocity. Whereas competing against lighter opponents represents a strategy to gain a rule-based advantage, WL for performance optimization reflects an effort to direct enhance physical capabilities. Most previous studies have primarily framed WL as a strategy for gaining a competitive edge,[33, 108-110] yet this perspective captures only one dimension of athletes' motivations. Notably, most athletes in this study perceived that WL did not compromise the fairness of competition, consistent with perceptions among Chinese kickboxers.[83] This suggests a need for a more objective and nuanced understanding of why athletes engage in WL rather than attributing it solely to pursuit of competitive advantage.

Approximately half of the participants perceived that WL could enhance performance and had no impact on health, whereas only a small proportion perceived WL as harmful to either performance or health. Such perception may partly explain the high WL% observed in this study. However, current evidence regarding the effects of WL on athletic performance remains inconclusive,[111-113] while its adverse health consequences are well documented.[114-120] Athletes' perceptions of WL are strongly influenced by their coaches,[100] who themselves often have limited nutrition knowledge,[99, 100, 102, 107] and the lack of nutritionists and doctors in most teams further perpetuates misconceptions about WL. These findings highlight the importance of ensuring that CS teams include at least one nutritionist and one doctor to support athletes in managing WL safely. Notably, athletes' perceptions of WL did not differ by sports discipline or competitive level, suggesting a shared belief system across groups. More concerning was the finding that no significant differences were observed in athletes' WL practices (including habitual WL%, highest WL%, and WR/WL ratio) based on athletes' perceptions of WL's impact on performance, health, and fairness. In other words, regardless of whether WL was viewed as harmful or beneficial, athletes engaged in similar WL behaviors. This suggests that personal perceptions alone do not determine WL practices, which are likely driven by multiple external factors such as competitive demands, match strategies, weight category structures, and prevailing team culture.[4, 5] In high-level competitive, athletes may continue to adopt aggressive WL practices despite recognizing potential health risks, as achieving a certain degree of WL is often perceived as an essential for maintaining competitiveness.[4] Moreover, extreme WL may have become an accepted norm within teams, reinforced by peer influence and entrenched cultural practices.[5] Therefore, interventions that focus only on increasing athletes' knowledge of WL are unlikely to be sufficient.[121] Structural interventions are necessary, including providing professional nutritional support, developing evidence-based weight management guidelines, coach education, and implementing regulations limiting the extent of WL. Only through education and system-level support can healthier and safer WL practices be promoted among CS athletes.

In this study, only 6% of athletes presented with ED symptoms, a prevalence lower than that reported in previous surveys of female adolescent athletes from other sports using EDE-Q with cut-off 4.0 (18–35%).[70-75] No significant differences were observed in WL experience, habitual WL%, or habitual WL% during 1 day prior to weigh-in between athletes with and without ED symptoms. Similarly, global ED scores did not differ across competitive levels, sports disciplines, WL experience, allocated WL time, habitual WL%, or habitual WL% during 1 day prior to weigh-in. These findings suggest that, among female adolescent CS athletes, ED symptoms and their severity during the off-season are not associated with habitual WL practices. This result aligns with previous research showing that RWL variables in CS were related only to post-competition dietary restraint scores in males seven days after the competition, with no significant correlations found in females for any DE scores.[69] Furthermore, DE scores in female athletes have been shown to improve during three weeks following competition.[69] Collectively, these results indicate that WL behaviors may exert limited influence on ED symptoms and its severity during off-season in this population. One possible explanation is that athletes may hold an 'adaptive' perception toward weight management behaviors, whereby frequent control strategies behaviors are not considered as abnormal and thus may not be fully reflected in questionnaire responses. Another contributing factor may be the relatively short duration of sport participation and WL engagement (averaging only one year) in this cohort, combined with the off-season timing of data collection, may have further contributed to the low prevalence and underreporting of ED symptoms. Future research should employ longitudinal studies or in-season follow-up designs to explore the dynamic relationship between WL practices and ED symptoms over time. Moreover, studies involving athletes with longer WL experience are needed to determine whether extended exposure to WL behaviors increases the severity of ED symptoms.

This study has two main limitations. First, it relied on retrospective self-reported data, which may have introduced recall and social desirability biases. Future studies should consider more objective approaches, such as using calibrated weight scales to record daily or pre- and post-training BM changes. Second, athletes who had never engaged in WL were not invited to complete the EDE-Q8. As a result, it remains unclear whether there were differences in the prevalence and severity of ED symptoms between athletes with and without WL experience and across different phases of the competitive season.

Conclusion

The prevalence and the magnitude of WL were found to be high among Chinese female adolescent CS athletes. Most athletes engaged in long-term WL, typically allocating 15+ days to reduce a substantial proportion of their BM—often combined with the use of plastic suits—being the predominant method. Coaches were the primary figures guiding WL practices, whereas nutritionists and doctors were rarely involved and had minimal influence. The primary reason for athletes engaged in WL was to compete against lighter opponents to increase their likelihood of winning. Most athletes perceived that WL had no impact on health, enhanced performance, and did not lead to unfair competition, with these perceptions consistent across sports disciplines, competitive levels, and WL practices. The off-season prevalence of ED symptoms and mean global ED score was relatively low, showing no significant differences or association with habitual WL behaviors. Taken together, these findings suggest that interventions that focus solely on improving athletes' knowledge about WL are unlikely to alter entrenched WL practices among female adolescent CS athletes. Instead, structural interventions are required, including the provision of professional nutritional support, development of evidence-based weight management guidelines, coach education, and the implementation of regulations limiting the extent of WL.

Acknowledgements

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

Declaration of interest statement

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability statement.

All data are available on reasonable request

Funding

This paper is supported by the National Social Science Fund of China, National Office for Philosophy and Social Sciences (grant number: 24BTY097).

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Table 1. Statistical analysis methods used in the present study to assess the differences or correlation between weight loss practice, perception, and eating disorders variables.

Dependent variable	Data type	Independent variables	Data type	Method	P
Age began WL practices	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	0.836
		Sports discipline	Categorial	Kruskal-Wallis' tests	0.020*
		Whether the coach guided WL progress	Categorial	Mann-Whitney U test	1.000
Highest WL%	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	0.044*
		Sports discipline	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of WL on health	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of WL on performance	Categorial	Kruskal-Wallis' tests	0.770
		Perception of the impact of fairness on performance	Categorial	Kruskal-Wallis' tests	1.000
		Whether the coach guided WL progress	Categorial	Mann-Whitney U test	1.000
		Age	Continuous	Spearman's rank correlation test	0.532
		Age began WL practices	Continuous	Spearman's rank correlation test	1.000
		WL experience	Continuous	Spearman's rank correlation test	0.209
		Number of WL last year	Continuous	Spearman's rank correlation test	0.456
Habitual WL%	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	1.000
		Sports discipline	Categorial	Kruskal-Wallis' tests	0.682

		Perception of the impact of WL on health	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of WL on performance	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of fairness on performance	Categorial	Kruskal-Wallis' tests	1.000
		ED symptom	Categorial	Mann-Whitney U test	0.640
		Whether the coach guided WL progress	Categorial	Mann-Whitney U test	0.336
		Age	Continuous	Spearman's rank correlation test	1.000
		Age began WL practices	Continuous	Spearman's rank correlation test	1.000
		WL experience	Continuous	Spearman's rank correlation test	0.608
		Number of WL last year	Continuous	Spearman's rank correlation test	1.000
Number of WL last year	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	1.000
		Sports discipline	Categorial	Kruskal-Wallis' tests	0.022*
		Whether the coach guided WL progress	Categorial	Mann-Whitney U test	1.000
		Age	Continuous	Spearman's rank correlation test	1.000
		WL experience	Continuous	Spearman's rank correlation test	0.017*
		Number of competitions participated last year	Continuous	Spearman's rank correlation test	0.017*
WR% after competition	Continuous	Habitual WL%	Continuous	Spearman's rank correlation test	0.017*
		WL experience	Continuous	Spearman's rank correlation test	0.133
WR/WL ratio	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	0.374

		Sports discipline	Categorial	Kruskal-Wallis' tests	0.088
		Perception of the impact of WL on health	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of WL on performance	Categorial	Kruskal-Wallis' tests	1.000
		Perception of the impact of fairness on performance	Categorial	Kruskal-Wallis' tests	1.000
		Whether the coach guided WL progress	Categorial	Mann-Whitney U test	0.936
		Age	Continuous	Spearman's rank correlation test	1.000
		WL experience	Continuous	Spearman's rank correlation test	1.000
		Habitual WL%	Continuous	Spearman's rank correlation test	0.017*
Sports discipline	Categorial	Perception of the impact of WL on health	Categorial	Chi-square	1.000
		Perception of the impact of WL on performance	Categorial	Chi-square	1.000
		Perception of the impact of fairness on performance	Categorial	Chi-square	0.414
Competitive level	Categorial	Perception of the impact of WL on health	Categorial	Chi-square	1.000
		Perception of the impact of WL on performance	Categorial	Chi-square	1.000
		Perception of the impact of fairness on performance	Categorial	Chi-square	0.966
Global ED score	Continuous	Competitive level	Categorial	Kruskal-Wallis' tests	1.000
		Sports discipline	Categorial	Kruskal-Wallis' tests	1.000
		Allocated WL time	Categorial	Kruskal-Wallis' tests	1.000
		WL experience	Continuous	Spearman's rank correlation test	1.000

		Habitual WL%	Continuous	Spearman’s rank correlation test	1.741
		Habitual WL% during 1day before weigh-in	Continuous	Spearman’s rank correlation test	1.000
ED symptom	Categorial	WL experience	Continuous	Mann-Whitney U test	0.168
		Habitual WL% during 1day before weigh-in	Continuous	Mann-Whitney U test	1.000

Note: WL, weight loss; WR, weight regain; ED, eating disorder; EDE, eating disorder examination; * = differences between groups (P<0.05)

Table 2 General information of Chinese female adolescent combat sport athletes (n=169).

Variables	Data type	All participants (n=130)	Participants who never engaged in weight loss (n=35)	Participants who engaged in weight loss (n=95)	P
Age (years)	median (IQR)	15 (14-16)	15 (14-16)	15 (14-16)	1.000
	mean±SD	15.2±1.3	15.2±1.3	15.2±1.4	
Stature (cm)	median (IQR)	165 (160-170)	167 (160-173)	165 (160-169)	1.000
	mean±SD	165.5±6.0	166.7±7.4	165.0±5.5	
Current body mass (kg)	median (IQR)	55.0 (50.0-60.0)	57.0 (49-62)	55.0 (50-60)	1.000
	mean±SD	56.0±9.3	57.0±12.4	55.6±7.9	
Off-season weight (kg)	median (IQR)	55.0 (49.0-60.0)	55.0 (49-62)	55.0 (49-60)	1.000
	mean±SD	55.9±9.5	56.5±12.6	55.7±8.1	
Age began training in current sport (years)	median (IQR)	13.0 (12.0-14.0)	13.0 (12-14)	13.0 (12-14)	1.000

	mean±SD	12.7±1.5	13.0±1.7	12.6±1.7	
Age began competing in current sport (years)	median (IQR)	14.0 (13.0-15.0)	14 (13-15)	14 (13-15)	1.000
	mean±SD	14.0±1.6	13.9±2.2	14.1±1.4	
Competitions participated last competitive season (n)	median (IQR)	2.0 (1.0-2.25)	2 (1-2)	2 (1-3)	1.000
	mean±SD	2.1±1.1	2.0±1.1	2.1±1.2	
Medals gained during last competitive season (n)	median (IQR)	1.0 (0-2.0)	1 (0-2)	1 (0-2)	1.000
	mean±SD	1.3±1.2	1.2±1.1	1.4±1.3	

Note: * = differences between groups (P<0.05). IQR, interquartile range. SD, standard deviation.

Table 3 Weight loss history (n=95) and global eating disorder score (n=78) of Chinese female adolescent combat sport athletes who reported engaging in weight loss practices.

	Data type	Boxing (n=15)	Sanda (n=37)	Taekwondo (n=27)	Wrestling (n=9)	Judo (n=7)	P	Local (n=11)	Provincial (n=38)	National (n=46)	P	Total (n=130)
Age began WL (yr)	median (IQR)	14 (13-16)	15 (14-16)	13 (13-14)	15 (13.5-16)	14 (12-15)	0.020*	14 (13-14)	14 (13-16)	15 (14-16)	0.836	14 (13-15)
	mean±SD	14.3±1.3	15.0±1.1	13.7±1.0	15.0±1.4	13.7±1.5		13.8±1.3	14.2±1.3	14.7±1.1		14.4±1.3
WL experience (yr)	median (IQR)	0 (0-2)	1 (0-1)	1 (0-1)	1 (0-1.5)	1 (0-2)	/	0 (0-1)	0 (0-1)	1 (0-1)	/	1 (0-1)
	mean±SD	0.8±1.0	0.7±0.6	0.9±0.9	0.8±0.8	1.0±1.0		0.6±0.8	0.7±0.8	0.9±0.8		0.8±0.8
Highest WL (kg)	median (IQR)	6 (4-8)	6 (4.5-8)	5 (4-6)	4 (2.5-8)	3 (2-4)	/	3 (3-4)	5 (3.75-7.25)	6 (4-8)	/	5 (4-8)
	mean±SD	6.2±3.1	6.4±2.6	5.4±2.5	5.1±3.3	3.4±1.4		3.4±0.9	5.4±2.5	6.5±2.8		5.7±2.7

Highest WL (%)	median (IQR)	10.0 (7.5-13.8)	11.3 (7.9-13.5)	9.1 (7.1-11.1)	8.2 (4.2-14.3)	6.0 (4.1-8.2)	1.000	6.0 (5.0-8.3)	9.1 (7.0-12.3)	11.2 (8.2-14.6)	0.044*	9.1 (7.4-13.3)
	mean± SD	10.2±4.5	11.4±4.6	10.3±4.4	8.9±5.3	6.5±2.4		6.7±2.3	9.6±4.3	11.7±4.7		10.3±4.6
Habitual WL (kg)	median (IQR)	4 (3-5)	5 (3-6.5)	4 (3-5)	3 (0.75-4)	3 (2-4)	/	3 (3-4)	4 (2.75-5)	5 (3-6)	/	4 (3-6)
	mean± SD	4.2±1.8	5.1±2.7	4.2±1.8	2.4±1.9	3.1±1.3		3.2±0.8	4.0±2.1	4.8±2.6		4.3±2.3
Habitual WL (%)	median (IQR)	7.4 (4.5-8.6)	8.8 (5.5-12.7)	8.3 (5.5-9.5)	3.9 (1.3-7.8)	6.0 (4.1-8.2)	0.682	6.0 (5.0-7.7)	7.5 (4.0-9.1)	8.7 (5.0-11.5)	1.000	8.0 (4.8-9.6)
	mean± SD	7.0±2.6	9.1±5.1	8.1±3.3	4.4±3.7	5.9±2.4		6.3±1.7	7.2±3.7	8.7±4.8		7.8±4.2
Habitual WL during 60-9 days prior to weigh-in (%)	median (IQR)	4.1 (2.3-4.8)	6.2 (2.1-9.9)	3.4 (0.9-6.5)	0.9 (0.2-3.4)	4.1 (0.5-5.4)	/	1.8 (1.0-4.2)	4.2 (0.9-6.1)	4.8 (1.6-9.3)	/	4.1 (1.3-6.5)
	mean±	3.6±1.9	6.4±4.4	3.9±3.1	1.8±2.1	3.0±2.5		2.7±2.	4.0±2.9	5.5±4.		4.6±3.

	SD							1		3		7
Habitual WL during 8-2 days prior to weigh-in (%)	median (IQR)	2.2 (1.4-2.8)	1.3 (0.1-3.6)	1.9 (1.1-4.3)	1.7 (0.3-2.9)	1.5 (0.6-1.8)	/	1.7 (1.2-2.3)	1.9 (0.7-3.2)	1.7 (0.9-3.3)	/	1.7 (0.9-3.3)
	mean± SD	2.3±1.4	2.2±2.2	2.8±2.4	1.7±1.4	1.6±1.3		2.3±1.8	2.3±2.2	2.3±2.0		2.3±2.0
Habitual WL during 1 days prior to weigh-in (%)	median (IQR)	0.6 (0.1-1.7)	0.0 (0.0-1.0)	0.9 (0.0-2.0)	0.9 (0.4-1.5)	0.9 (0.6-1.4)	/	1.1 (0.6-2.0)	0.3 (0.0-1.4)	0.2 (0.0-1.4)	/	0.4 (0.0-1.4)
	mean± SD	1.0±1.1	0.6±1.0	1.3±1.6	0.9±0.6	1.4±1.5		1.3±1.1	0.9±1.3	0.9±1.2		0.9±1.3
WR before competition (kg)	median (IQR)	1 (0.5-2)	1 (0.5-1)	2 (1-2)	2 (1-2)	2 (0.5-2)	/	2 (1-2)	1 (0.5-2)	1 (0.5-2)	/	1 (0.5-2.0)
	mean± SD	1.0±0.6	1.1±1.0	1.8±1.0	1.6±0.6	1.6±1.0		2.0±1.0	1.4±1.0	1.2±1.0		1.4±1.0
WR before competition (%)	median (IQR)	1.5 (1.0-3.6)	1.8 (1.0-2.6)	4.1 (1.9-4.8)	3.3 (1.9-4.1)	3.8 (1.0-	/	4.2 (2.1-	2.1 (1.0-	1.9 (1.1-	/	2.1 (1.1-

						4.3)		4.8)	4.1)	3.5)		4.0)
	mean±SD	1.9±1.3	2.2±2.1	3.8±2.4	3.0±1.2	3.3±2.1		4.1±2.1	2.7±2.1	2.5±2.0		2.8±2.1
WL/WR before competition (%)	median (IQR)	25.0 (12.5-33.3)	20.0 (10.0-50.0)	50.0 (33.3-50.0)	66.7 (40.0-100)	50.0 (40.0-100)	0.088	50.0 (50.0-100)	33.3 (12.5-50.0)	29.2 (12.5-50.0)	0.374	33.3 (15.0-50.0)
	mean±SD	27.5±22.6	29.3±23.1	46.5±32.0	63.7±33.8	58.1±35.2		64.4±34.6	38.4±30.4	34.0±26.0		39.3±30.0
WR after competition (kg)	median (IQR)	2 (1.2-2)	3 (2-4)	3 (2-3.5)	2 (2-4)	3 (1-3)	/	2.0 (1-4)	2.0 (1.8-3.13)	3.0 (2-4)	/	2.0 (2-4)
	mean±SD	2.1±1.2	3.0±1.5	2.8±1.5	2.5±1.2	2.1±1.5		2.3±1.3	2.5±1.6	2.9±1.3		2.7±1.5
WR after competition (%)	median (IQR)	3.6 (2.6-4.0)	4.8 (3.7-6.9)	5.2 (3.7-7.1)	4.1 (3.3-6.5)	5.2 (2.0-6.1)	/	3.6 (2.2-6.9)	4.4 (2.8-6.2)	5.1 (3.7-6.9)	/	4.5 (3.4-6.8)
	mean±SD	3.7±2.2	5.7±3.1	5.7±3.0	4.6±2.4	4.1±2.8		4.5±2.4	4.7±3.1	5.7±2.9		5.2±2.9

Number of WL in the last year	median (IQR)	2 (1-3)	1 (1-2)	2 (1-3)	2 (1-2)	2 (2-3)	0.022*	1 (1-2)	2 (1-2)	1.5 (1-2)	1.000	2 (1-2)
	mean±SD	2.1±1.3	1.3±0.6	2.3±1.3	1.4±0.7	2.3±0.8		1.5±0.9	2.0±1.2	1.7±1.0		1.8±1.1
		Boxing (n=15)	**Sanda (n=36)**	**Taekwondo (n=16)**	**Wrestling (n=9)**	**Judo (n=2)**	**P**	**Local (n=8)**	**Provincial (n=30)**	**National (n=40)**	**P**	**Total (n=78)**
Global ED score	median (IQR)	1.4 (0.3-2.5)	0.9 (0.3-1.5)	1.4 (0.3-2.3)	0.9 (0.4-2.1)	0.5 (0.0-0.5)	1.000	0.9 (0.2-1.7)	1.2 (0.3-1.2)	0.9 (0.3-1.6)	1.000	1.0 (0.3-1.7)
	mean±SD	1.5±1.4	1.1±1.2	1.5±1.3	1.1±0.8	0.5±0.7		1.0±0.8	1.4±1.3	1.2±1.2		1.3±1.2

Note: * = differences between groups (P<0.05). / = not available. WL, weight loss. WR, weight regain. IQR, interquartile range. SD, standard deviation.

Table 4. Frequency analysis (%) of the weight loss methods used by Chinese female adolescent combat sport athletes (n=95).

	Always		**Sometimes**		**Almost Never**		**Never Used**		**Do Not Use Any More**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Gradual dieting	11	12	40	42	20	21	19	20	5	5
Skipping meals	20	21	40	42	19	20	14	15	2	2
Fasting	9	10	8	8	16	17	55	58	7	7
Restricting fluid ingestion	26	27	30	32	13	14	21	22	5	5
Increased exercise	56	59	22	23	5	5	11	12	1	1
Training in a heated room	21	22	15	16	13	14	42	44	4	4
Sauna	8	8	7	7	9	10	64	67	7	7
Training in plastic suits	40	42	27	28	12	13	14	15	2	2
Use plastic suit all-day	5	5	11	12	13	14	61	64	5	5
Spitting	6	6	13	14	15	16	55	58	6	6
Laxatives	3	3	10	11	8	8	67	71	7	7
Diuretics	1	1	0	0	4	4	84	88	6	6
Diet pills	1	1	6	6	7	7	75	79	6	6
Vomiting	4	4	12	13	9	10	64	67	6	6

Hot water immersion	4	4	9	10	7	7	70	74	5	5
Hot saltwater immersion	2	2	2	2	6	6	79	83	6	6
Others	4	4	1	1	8	8	77	81	5	5

Table 5. Frequency analysis (%) of the sources of influence on the weight loss practices of Chinese female adolescent combat sport athletes (n=95).

	Very influential		**Some influence**		**Unsure**		**Little influence**		**Not influential**		**IS**
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Other athletes (different sports)	0	0	9	10	10	11	7	7	69	73	160
Other athletes (same sport)	5	5	35	37	10	11	13	14	32	34	268
Doctors	0	0	6	6	12	13	15	16	62	65	160
SC coaches /physical trainer	6	6	18	19	12	13	15	16	44	46	223
Coaches	31	33	30	32	11	12	8	8	15	16	361
Parents	12	13	25	26	8	8	22	23	28	30	269
Nutritionists	1	1	4	4	12	13	8	8	70	74	150
Journal articles	1	1	3	3	7	7	12	13	72	76	140
Book/magazines	2	2	2	2	7	7	12	13	72	76	141
Internet sources	2	2	7	7	10	11	11	12	65	68	163
Others	1	1	3	3	10	11	8	8	73	77	143

Note: SC, strength and conditioning; IS, influence score.