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Evaluation of Performance Perceptions in Adult Combat Athletes about Rapid Weight Loss Practices and Poor Eating Habits in Two Lebanese Cities – A Pilot Study

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ABSTRACT

Background: Combat sports are competitive contact sports where two participants (one-on-one conflicts) battle. Rapid weight loss (RWL) with dehydration (a dangerous practice) followed by rapid weight gain (RWG) is a standard pre-competition protocol. To achieve pre-competition weight limits, combat athletes often use rapid weight loss techniques that, in addition to an unhealthy diet, play an essential role in their physical performance. **Objective:** This pilot study assessed the impact of these two factors on the perceived performance of combat athletes, such as speed, endurance, fitness, and more, in two Lebanese cities. **Methods:** We selected a group of 384 combat athletes aged 18-40 from 65 private clubs in Beirut and Mount Lebanon. All completed questionnaires about socio-demographics, BMI, rapid weight loss practices, diet, and perceived performance. **Findings:** Combat athletes who adopted adequate rapid weight loss practices were positively associated with a healthy diet (polycorrelation = 0.1894, SE = 0.0745, Wald chi-square statistic = 6.46320, $p<0.0001$). Also, adequate rapid weight loss (polycorrelation = 0.9667, SE = 0.0083, Wald's chi-squared statistics = 13565.23, $p<0.0001$) and healthy diet (polycorrelation = 0.3393, SE = 0.0700, Wald's chi-square statistics = 23.4948, $p<0.0001$) were positively associated with compatible perceived performance. **Recommendation:** There is a link between rapid weight loss practices, poor eating habits, and perceived performance. Rapid weight loss practices can prevent combat athletes from getting the nutrients they need, which can interfere with their performance, damage their immune system, and increase the risk of injury. Large-scale longitudinal studies are required to confirm the findings.

Keywords: rapid weight loss, diet, combat athletes, clubs, combat sports

INTRODUCTION

Combat sports are competitive contact sports in which two participants (one-on-one conflicts) engage in combat using predefined rules of engagement. In this sport, rapid weight loss (RWL) with dehydration (dangerous practices) followed by rapid weight gain (RWG) is a standard pre-competition protocol (Štangar et al., 2023). Rapid weight loss is defined as losing much weight quickly using various techniques. Combat athletes do this to gain an advantage by competing in heavyweights below their normal fighting weight. The contestants then try to regain the weight lost between the weigh-in and the contest to become heavier than their opponents. On the other hand, unhealthy eating is a habit adopted by combat players, which includes dangerous types of food (fast food, sugar, and more), insufficient sleep, and when a person does not listen to their hunger cues and many bad habits. These two factors are essential for the performance and health of athletes (Baranauskas et al., 2022; Lakin et al., 1990). Several studies have shown that rapid weight loss

affects combat athletes' performance negatively and positively depending on their exercise and exercise (Lakicevic et al., 2020). In the research that has been conducted (Gonçalves et al., 2021), it has been proven that adequate strategies (balanced diet, portion control, regular exercise, etc.) to lose weight combat athletes avoid unhealthy diets. Also, for those involved with commercial weight loss programs, more significant weight loss during the program was associated with increased physical activity (Höchsmann et al., 2022). The study aimed to determine whether rapid weight loss practices and poor eating habits in combat athletes were associated with poor performance in two Lebanese cities – Beirut and Mount Lebanon. We hypothesize that rapid weight loss practices and poor eating habits in combat athletes are negatively associated with their poor performance. This method is often done to extremes, such as dehydration, drastic calorie restriction, or excessive exercise. Combat sports athletes like boxing, gambling, MMA, and wrestling generally carry it out. In Lebanon, combat sports have been on the rise, especially among women who have practiced martial arts, both in clubs and in tournaments (Canaan; online documents), and the practice of rapid weight loss is increasingly becoming a health problem among them. This pilot study will help conduct a full-scale study examining how to improve overall performance and well-being among combat athletes by reducing the risk of injury, improving recovery, and promoting healthier food choices and balanced weight. Also, this is one of the few studies conducted on combat athletes in Lebanon, which is experiencing a severe economic crisis.

METHOD

Study design and sampling procedure

A cross-sectional study using snowball sampling was conducted on combat athletes of both sexes aged 18 to 40 years (due to maximum oxygen capacity at this age and better performance) who lived in Beirut and Mount Lebanon. Due to the post-COVID-19 economic crisis, the complete list of martial arts clubs currently available in Beirut and Mount Lebanon is unknown, as many may have closed. The selection of clubs follows the objectives and characteristics of the participants needed for this study.

Of the total number of 145 combat sports clubs that we can find in Beirut and Mount Lebanon, only 75 meet the study requirements. Of these 75 clubs, 65, or 86.7%, agreed to participate in the study. The coaches of these clubs are contacted by the Combat Athletes Federation in Lebanon by email or visited by their club staff and asked about the average number of club members. Club owners allow them to see their clubs ask their members in combat sports areas and group sessions to participate in research. People who agreed to participate in the study were asked to fill out a questionnaire by the coach using a URL address via Instagram, Facebook, or WhatsApp, which was sent to them by the coach.

The study design flow diagram is shown below in Figure 1.

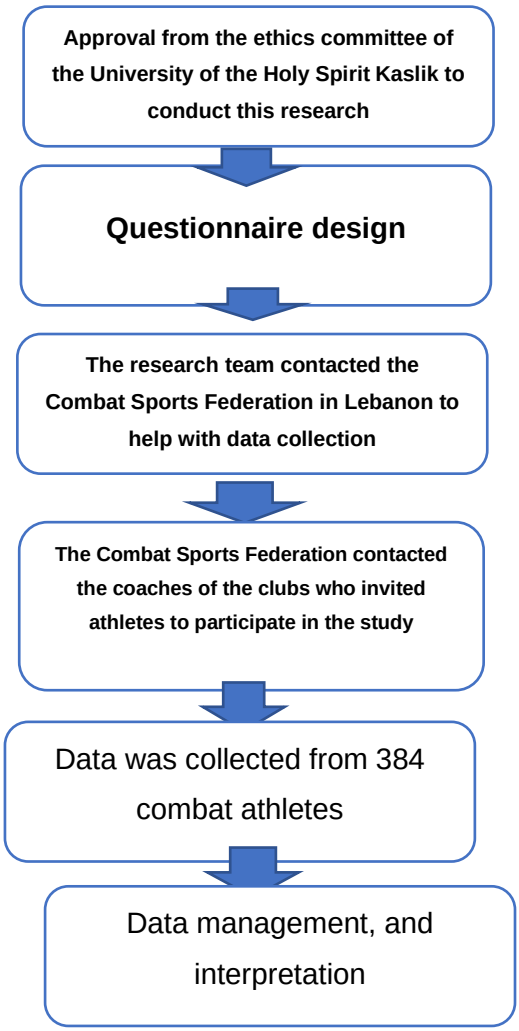

Figure 1. Study design flowchart

Participants

The study participants came from the Lebanese population (athletes) who played any combat sport. To be considered for inclusion, athletes must be playing combat sports (recreational or elite), live in Beirut and Mount Lebanon and be between 18-40 years old. Between January 2023 and February 2023, they were selected from several clubs that offer combat sports in both cities.

Learning Instruments

The study used questionnaires to organize data collected on socio-demographics, anthropometry, physical activity, rapid weight loss practices, diet, and perceived performance via emails sent to coaches of clubs in Beirut and Mount Lebanon. A validated questionnaire (KomPAN_manual_english_version_25-11-2020_last_korekta_2021.pdf, n.d.) covering six main sections was used. In the first section, socio-demographic information about the athletes related to age, gender, marital status, region of residence in Lebanon, education level, and nationality. The second part includes anthropometric factors such as athletes' weight (kilograms) and height (meters). The third part includes physical activity, including the type of combat sport each athlete

participates in. The fourth section, rapid weight loss data, takes into account the weight classes that athletes follow, the weight loss to compete, the most weight loss to compete last season in kilograms, the number of times to lose weight, the average weight loss before competition in kilograms, the number of days it takes to lose weight before a game, the age at which athletes start cutting weight and the weight gained (in kilograms), in the week after the competition. In the fifth part of the questionnaire, which resembles a general nutrition questionnaire [8], the eating habits of the athletes are taken by answering several questions such as the amount of food consumed each day, snacks between meals, the type of milk consumed, how to prepare food, the kind of bread spread used, the type of fat used for frying, whether sugar is added to hot drinks, whether salt is added to food and the kind of water drunk. Finally, in the sixth part, the performance of combat athletes perceived in an activity is discussed. A microscopic pilot study was previously conducted on 30 participants to verify the feasibility and practical problems of the questionnaire. These participants were also included in this analysis because no issues were observed in the format and content of the survey.

Statistical Analysis

Data was analyzed using SPSS 26 and SAS 9.4 software (SAS Institute, 2013). Descriptive analyses for RWL, EP, and PP practices were also examined based on residence (Mount Lebanon versus Beirut) and socio-demographic variables such as age at 18-25, 26-33, and 34-40; marital status as single, married, and divorced/widowed; gender as male and female and level of education as bachelor's, bachelor's degree and master's/doctoral degree. These categorical variables are displayed as frequency and percentage. The nonparametric Wilcoxon number rating test or the Kruskal-Wallis test is performed to investigate the relationship between perceived performance and socio-demographic characteristics. The relationship between RWL, EP, and PP is estimated using a poly correlation with its statistical significance, which is assessed using the asymptotically valid chi-squared test of Wald due to the large sample size.

We perform reliability retests of items for the RWL practice of combat athletes as they capture the internal consistency and reproducibility of scale. The reliability of the 0.805 retests for the fighter's RWL practice shows that it is reliable because a score of 0.8 and above is considered acceptable.

RESULTS AND DISCUSSION

Distribution of combat sports, socio-demographic characteristics, and anthropometry of athletes

In total, 384 athletes were enrolled in the study. The most commonly played combat sports are judo 160, boxing 95, muay thai 35, karate 29, mixed martial arts 24, taekwondo 18, jujutsu 9, kung fu 7, fencing 5, and kickboxing athletes 2. There were 196 males and 188 females. About half of the participants were married, a third were single, a quarter were divorced, and only three were widowed. All athletes have some level of education; Most have a bachelor's degree followed by a

graduate degree. The athletes' weight and height were given by themselves on a Google form and used to calculate the BMI of participants, which was classified into five groups: underweight, normal weight, overweight, obesity class I, obesity class 2, and obesity class 3. Nearly thirty-two percent (31.8%) of athletes were class 1 obese, 20.8% were overweight, 17.4% were class 2 obese, 16.9% were standard, and only 13.1% were class 3 obese, suggesting that due to the higher amount of lean muscle mass of athletes, BMI should not be the only factor used to determine their overweight or obesity. The findings are presented in Table 1.

Table 1. Percentage distribution of sociodemographic factors of athletes

Activities	Participants Frequency	%
Age in years		
18 – 25	149	38.8
26 – 33	223	58.1
34 – 40	12	3.1
Gender		
Man	196	51.0
Woman	188	49.0
Marital status		
One	115	29.9
Marry	186	48.4
Divorced/Widowed	83	21.6
Education Level		
Sarjana	26	6.8
Bachelor's degree	228	59.4
Postgraduate degree	130	33.9
Residence		
Beirut	168	43.7
Mount Lebanon	216	56.3

Fast weight loss practices

All athletes have lost weight to compete, and three categories of weight competitions are used where half compete between 60 – 80 kg, one-third for more than 80 kg, and the other for under 60 kg. Furthermore, the average weight loss before and after the competition and the number of times this was done was also analyzed, as shown in Table 5, with the following results.

The most weight loss to compete in their careers was divided into four categories, with 110 participants losing less than 10 kg, 213 losing 10 to 20 kg, 46 losing 20 to 30 kg, and 15 losing over 30 kg. In contrast, 166, 143, 68, and 7 participants competed for 2 times, 1 time, 3 times, and more than 3 times, respectively. For weight loss before the competition, 213 participants lost less than 5 kg, 159 lost 5 to 10 kg, and 12 lost more than 10 kg. In contrast, weight was regained a week after the competition; 238 athletes lost less than 5 kg, 113 lost 5 to 10 kg, and 33 lost more than 10 kg. Also, the other half, quarter, and quarter of the athletes lose weight in 100 days, between 5 to 90

days, and 120 to 300 days, respectively, before the competition starts. The findings are presented in Table 2.

Table 2. Description of rapid weight loss practices

Activities	Participants Frequency	%
Competing heavyweights		
Under 60 kg	39	10.2
60 – 80 kg	192	50.0
Above 80 kg	153	39.8
Losing weight to compete		
Already	384	100.0
No	0	0
The most weight loss to compete		
Less than 10 kg	110	28.6
10 to 20 kg	213	55.5
20 to 30 kg	46	12.0
Above 30 kg	15	3.9
Many times, I cut weight to compete last season		
1 time	143	37.2
2 times	166	43.2
3 times	68	17.7
More than 3 times	7	1.8
Weight loss before the competition		
Less than 5 kg	213	55.5
5 to 10 kg	159	41.4
Above 10 kg	12	3.1
Weight back in the week after the competition		
Less than 5 kg	238	62.0
5 to 10 kg	113	29.4
Above 10 kg	33	8.6

Diet

Almost all athletes do not regularly consume food; three-quarters consume three meals a day, and the other is between 1, 3, 4, and 5 meals or more. Regarding the frequency of snacking, several meals a day are the most common, followed by never snacking. Nonfat and low-fat milk and milk drinks are the most consumed by athletes. Most prepare their meat grilled or boiled, and a small number prepare it by boiling or grilling, or they don't eat meat, while only two prepare it fried. For bread spreads, 69% of athletes did not use any, 24% used margarine, 5% used butter, and 2% used mayonnaise and various spreads. Eighty-five percent, 9%, and the remaining athletes each added no sugar to their hot drinks, added substitute sugar sweeteners, and used sugar. Seventy-five percent of participants did not add salt to their meals and sandwiches after they were prepared; others added salt only occasionally. For water consumption, almost all athletes use calm water; Five used sparkling water, two used flavored water, and only one did not drink water. The findings are presented in Table 3.

Table 3. Diet description

Activities	Participants Frequency	%
Foods consumed daily		
1 meal	12	3.1
2 meals	52	13.5
3 meals	258	67.2
4 meals	57	14.8
5 meals or more	5	1.3
Foods consumed regularly		
No	356	92.7
Yes, some of them	22	5.7
Yes, everything	6	1.6
Snacks between meals		
Several times a day	221	57.6
Never	130	33.9
Once a week	9	2.3
Several times a week	9	2.3
Once a day	8	2.1
1-3 times a month	7	1.8
Meat is prepared		
Panggang	216	56.3
Boiled	86	22.4
Rebus	37	9.6
Panggang	24	6.3
I don't eat meat	19	4.9
Goreng	2	0.5
Bread spread is used.		
Unused	267	69.5
Margarine	95	24.7
Mentega	18	4.7
Mayonnaise	3	0.8
Other former spreads	1	0.3
Sugar is added to hot drinks		
No	324	84.4
Yes, low-calorie sweeteners used	37	9.6
Yes, add a teaspoon of sugar or honey	18	4.7
Yes, add two teaspoons of sugar or honey	5	1.3
Salt is added to foods and sandwiches		
No	320	83.3
Yes, but only occasionally	64	16.7
Water drinks		
Calm water	376	97.9
Air soda	5	1.3
Flavored water	2	0.5
No water	1	0.3

Symptoms of physical performance of athletes

The participants were classified into seven groups: never, always, often, rarely, sometimes, very usually, and more frequently, according to their physical performance symptoms. A high

percentage of them (43.2-49.0%) never had symptoms of general stress, stress, fatigue, lack of energy, physical complaints, sleep quality, impaired rest, fatigue, injury, and unmotivation; A quarter, 13%, 5%, 10% and the rest (only 3 to 6 people) have it constantly, often, sometimes, during rapid weight loss and between very often and more frequently, respectively.

Table 4. Symptoms of physical performance of athletes

I'm a Symp. Ke toms	Frequency of participants n (%)						
	Never	Always	Often	Infrequently	Sometimes	Very often	More often
S	188 (49.0)	89 (23.2)	53 (13.8)	30 (7.8)	16 (4.2)	5 (1.3)	3 (0.8)
Pears Ure	172 (44.8)	91 (23.7)	53 (13.8)	44 (11.5)	17 (4.4)	4 (1.0)	3 (0.8)
Fati F Fatigue	174 (45.3)	91 (23.7)	54 (14.1)	42 (10.9)	17 (4.4)	3 (0.8)	3 (0.8)
Lac lake energy	172 (44.8)	87 (22.7)	56 (14.6)	42 (10.9)	19 (4.9)	5 (1.3)	3 (0.8)
Physical physique Cal Cal Com OMC complaints	171 (44.5)	87 (22.7)	55 (14.3)	45 (11.7)	18 (4.7)	5 (1.3)	3 (0.8)
Sleep sl Q quality	172 (44.8)	87 (22.7)	57 (14.8)	44 (11.5)	16 (4.2)	5 (1.3)	3 (0.8)
Dist Rest curbed disturbed	174 (45.3)	87 (22.7)	54 (14.1)	40 (10.4)	19 (4.9)	6 (1.6)	4 (1.0)
Fatigue	166 (43.2)	88 (22.9)	53 (13.8)	49 (12.8)	20 (5.2)	5 (1.3)	3 (0.8)
I'm hurt	167 (43.5)	86 (22.4)	54 (14.1)	50 (13.0)	17 (4.4)	5 (1.3)	5 (1.3)
An Unmoti Va voted	166 (43.2)	86 (22.4)	56 (14.6)	51 (13.3)	18 (4.7)	4 (1.0)	3 (0.8)

Perceived athlete performance based on socio-demographic features

Perceived athlete performance ratings vary significantly based on place of residence (Beirut vs Mount Lebanon) and socio-demographic characteristics of gender, education, and marital status. The following groups have a compatible or relatively higher proportion of perceived performance: Beirut residents, women, undergraduates, married/divorced/widowed versus single. The following groups have a higher proportion of adequate rapid weight loss practices: younger, undergraduate, divorced/widowed. The following groups have a higher proportion of healthy diets: Lebanese Mountain dwellers, males, middle-aged and single. The results are presented in Table 5.

Table 5. Perceived Performance (n(%)) of combat athletes based on selected socio-demographic characteristics

Cov	Perceived Performance			Rapid weight loss			Diet					Mr
	Incompatible	Relatively compatible	Compatible	Aggressive Adequate	Light	Enough	Too much stress	Stress	Healthy stress	Relatively compatible	Compatible	
Age												
18–25	16	50	83	16	50	83	25	72	52	50(33.6%)	83(55.7%)	
	(10.7)	(33.6)	(55.7)	(10.7)	(33.6)	(55.7)	(16.8)	(48.3)	(34.9)			
26–40	98	13	124	122	13	100	10	0	225	13(5.5%)	124(57.8%)	^
	(41.7)	(5.5)	(57.8)	(51.9)	(5.5)	(42.6)	(4.3)	(0)	(95.7)			
Seks												
Man	80	13	103	80	13	103	0	0	196	13(6.6%)	103(52.6%)	
	(40.8)	(6.6)	(52.6)	(40.8)	(6.6)	(52.6)	(0)	(0)	(100)			*
Woman	34	50	104	58	50	80	35	72	81	50(26.6%)	104(55.3%)	
	(18.1)	(26.6)	(55.3)	(30.9)	(26.6)	(42.6)	(18.6)	(38.3)	(43.1)			
Status												
One	55	13	47	55	13	47	0	0	115	13(11.3%)	47(40.9%)	
	(47.8)	(11.3)	(40.9)	(47.8)	(11.3)	(40.8)	(0)	(0)	(100)			
Marry	46	38	102	70	38	78	13	38	135	38(20.4%)	102(54.8%)	*
	(24.7)	(20.4)	(54.8)	(37.6)	(20.4)	(41.9)	(7.0)	(20.4)	(72.6)			
Divorce/Widowhood	13	12	58	13	12	58	22	34	27	12(14.5 %)	58(69.9%)	
	(15.7)	(14.5)	(69.9)	(15.7)	(14.5)	(69.9)	(26.5)	(41)	(32.3)			
Dididik												
Undergrad	0	2	24	0	2	24	0	0	26	2(7.7%)	24(92.3%)	
	(0)	(7.7)	(92.3)	(0)	(7.7)	(92.3)	(0)	(0)	(100)			
Sarjana	50	50	128	74	50	104	35	72	121	50(21.9%)	128(56.1%)	
	(21.9)	(21.9)	(56.1)	(19.3)	(13.0)	(27.1)	(15.4)	(31.6)	(53.1)			*
Postgraduate	64	11	55	55	11	43	0	0	130	11(8.5%)	55(42.3%)	
	(49.2)	(8.5)	(42.3)	(50.5)	(10.1)	(39.5)	(0)	(0)	(100)			
Residence												
Mount Lebanon	80	13	123	92	13	111	0	0	216	13(6.0%)	123(56.9%)	
	(37.0)	(6.0)	(56.9)	(42.6)	(6.0)	(51.4)	(0)	(0)	(100)			
Beirut	34	50	84	46	50	72	35	72	61	50(29.8%)	84(50%)	*
	(20.2)	(29.8)	(50)	(27.4)	(29.8)	(42.9)	(20.8)	(42.9)	(36.3)			

Note: It is essential for RWL and EP; it is significant for PP and EP; it is necessary for RWL, PP, and EP; and it is vital for PP and RWL.

The Association between Rapid Weight Loss, Diet, and Perceived Performance

The highest percentage for rapid weight loss practices was for adequate rapid weight loss practices (47.7%), followed by incompatible (35.9%) and relatively compatible (16.4%). For perceived performance, the majority (53.9%) are compatible, followed by incompatible (29.7%) and relatively compatible (16.4%). The most significant percentage for diet is for healthy stress (72.1%), followed by stress (18.8%) and excessive stress (9.1%).

There was a positive relationship (polycorrelation = 0.1894, SE = 0.0745, Wald chi-square statistic = 6.46320, $p<0.0001$) between RWL and EP. Furthermore, there was a positive relationship between EP and PP (polycorrelation = 0.3393, SE = 0.0700, Wald chi-square statistic = 23.4948, $p<0.0001$) as well as between RWL and PP (polycorrelation = 0.9667, SE = 0.0083, Wald chi-square statistic = 13565.23, $p<0.0001$). These results are presented in Table 6.

Table 6. Diet description

Association	Polycorrelation (SE)	Forest chi-squared statistics (p-value)
EP and PP	0.3393 (0.070)	23.4948 (<0.0001)
RWL and PP	0.3393 (0.0083)	13565.23 (<0.0001)
RWL dan EP	0.1894 (0.0745)	6.46320 (<0.0001)

The results of this study contribute to the existing knowledge of rapid weight loss practices, perceived performance, and diet among combat athletes. The study analyzed the relationship between combat athletes' RWL practices, diet, and perceived physical performance. It was found that EP and RWL were positively correlated, and each was positively correlated with PP. If the athletes are too young, they have a more adequate RWL training. Younger people may have a greater desire to conform to specific body standards prevalent in their sport or a perceived need to achieve rapid weight loss for a competitive advantage. Additionally, younger athletes may need more experience and knowledge of the potential risks and negative consequences associated with extreme RWL practices. These findings differ from other studies that found younger athletes experienced lower levels of nutritional stress (Reljic et al., 2015) and from Degoutte et al. (2005) and Koral and Dosseville (2009), who found higher perceived levels of performance among men. For sambo athletes, Drid et al. (2021) found a higher prevalence of RWL practice among men than women. Horswill et al. (1990) argue that physiological and metabolic differences between men and women may play a role in influencing the adoption of RWL practices. However, we did not find the difference statistically significant for combat athletes in the Lebanese population. Social and cultural factors, such as social pressures, body image ideals, and gender norms in certain sports or athletic disciplines, may contribute to the gaps we found in contrast to the other studies discussed above. For the level of nutritional stress, this explanation is in line with previous research on the eating habits of children who do not meet their daily dietary needs, such as food quality, frequency of meals, and variations in nutrient intake (Coswig et al., 2015). Athletes who live in Mount Lebanon have more compatible performance and a healthy diet. Various factors associated with living in Beirut, such as increased work demands, traffic congestion, and higher population density, can contribute to higher stress levels, affecting eating behavior. Our findings differ from those of Coswig et al. (2015), who found differences in RWL practices based on residence. More educated athletes have performance that is more compatible with more excellent perception, partly because they may have specialized knowledge, skills, and training that can improve their self-perception and performance evaluation. These athletes may also have a deeper understanding of their sport, which can lead to increased

confidence and a better perception of their abilities (Reale et al., 2020). The athletes had more adequate RWL practices consistent with other studies (Artioli et al., 2020). This could be because they are more aware of the right way to practice RWL. Marital status is associated with athletes' RWL practices, healthy diet, and perceived performance. Being in a committed marriage provides stability and support, contributing to healthier stress levels regarding food choices and eating behaviors. Married individuals may have access to social support, shared responsibility, and a supportive environment that promotes healthier eating habits.

Our findings reveal important insights into the patterns and preferences of combat athletes related to weight loss behaviors, compatibility in performance, and diet-related stress levels. First, the high percentage (47.7%) of participants who engaged in adequate rapid weight loss practices was encouraging. This implies that these athletes may have a level of knowledge and understanding regarding the potential risks associated with extreme weight loss practices and the importance of adopting a healthier approach (Nawi et al., 2021). This may indicate that combat athletes in this sample population manage the stress associated with exercise and their weight loss practices healthily. Additionally, they may have effective coping mechanisms and strategies for dealing with competitive pressure and weight management. Regarding perceived performance, the highest level (53.9%) was reported for compatibility, indicating that many combat athletes view their performance positively. This high level suggests a generally positive self-perception and evaluation of their abilities and achievements. However, it should be noted that a significant proportion (29.7%) also reported that their performance did not match theirs. Understanding the factors contributing to these differences can be crucial for developing interventions to support athletes in improving their perceived performance and overall satisfaction (Drid et al., 2021). The most significant percentage (72.1%) of healthy diets was the encouraging finding. However, about twenty-four percent (23.7%) experience stress all the time, which raises concerns as excessive stress can harm physical and psychological well-being (Nawi et al., 2021). Further investigation is needed to understand the factors contributing to these stress levels and develop interventions to promote healthier stress management among combat athletes.

This study has strengths and limitations. This is the first study in the Lebanese population to examine the association between rapid weight loss practices, poor eating habits, and perceived performance in combat athletes. The sample used for this study tends to be representative of the population because the proportion of private clubs that meet the selection criteria participating in this study is very high. The study uses internally validated and reproducible structured questionnaires for data collection. Controlling the dwelling captures life's different environmental and socio-cultural influences in terms of perceived performance in both cities. The respondents were shown pictures of food that helped reduce their dependence on memory and, therefore, reduced memory bias when answering questions about food absorption. Response bias is also tiny for RWL practice items because the reliability of their retests is high, even though they are based on self-reported data. The strength of the association examined may have been overestimated due to the use of cross-sectional

study designs. Two-way and causal relationships cannot be done for the same reason. Given that this is a pilot study, we did not recruit enough participants in our study sample to allow for adjustments by each confounding in our analysis. These factors can include place of residence, age, gender, education, marital status, type of combat athlete, and recreational vs elite athletes in combat sports. Adjustments by the latter two factors would explain that athletes from different combat sports are not similarly involved in rapid weight loss and that there are substantial differences in the involvement and impact of RWL practices between recreational and elite athletes in combat sports. Such differences will be crucial to understanding RWL practices in the diverse combat sports. Statistical adjustments based on these and other factors will help increase the potential generalization of the findings.

CONCLUSION

In conclusion, the study identified various sociodemographic factors influencing rapid weight loss practices among combat athletes and their overall negative relationship with performance-related aspects. In addition, overall unhealthy eating habits are negatively related to athletes' physical performance. The study highlights the importance of prioritizing good eating habits, such as adopting balanced nutrition and portion control, to maintain positive physical performance among combat athletes. It also emphasizes the need for a careful approach to rapid weight loss in combat sports and recommends regular exercise, adequate recovery, and healthier weight management strategies. By focusing on these factors, interventions can be designed to improve combat athletes' overall performance and well-being. Future research may include investigating the impact of protein shakes and fat burners on athletes' health, exploring interventions to promote healthier eating habits, and examining the long-term effects of rapid weight loss practices on health and performance. Large-scale and longitudinal studies at the population level are needed to re-examine the strength of the associations found in this study, taking into account the complete adjustment of potential confounding potential.

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HUMAN ETHICS & CONSENT TO PARTICIPANTS

The study design and questionnaire were approved by the research ethics committee (REC) of the higher research center (HCR) at the Holy Spirit University of Kaslik-USEK on February 23, 2023. The Helsinki Declaration carried out the research. Questionnaires are used to organize the data collected from the patient's file as approval from the medical center/clinic owner is taken. Each participant gives their written consent.

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