



Effects of extreme weight cutting on competitive sports performance among combat sports athletes

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Abstract

The primary aim of this study was to investigate the effects of extreme weight cutting on competitive sports performance of combat sports athletes who participated in the 20th Nation Sports Festival, Edo 2020. A total of 150 male and female combat sports athletes who took part in the festival were used. The athletes' weights were taken on arrival to camp. These were subtracted from their festival weight classes. The difference is the weight cut. The athletes were classified into: Those that did not cut weight, Actual Weight (AW), those involved in Moderate Weight Cut (MWC) and Those indulged in Extreme Weight Cut (EWC). The competitive sports performances/scores of the combat sports athletes and their weight types were recorded during the sports fiesta. The mean plots of the scores by weight types indicated that combat sports athletes who indulged in extreme weight cut has the least mean scores during the sports competition. Indicating that extreme weight cutting lead to poor competitive sports performance among the combat sports athletes who participated in the sports festival.

Keywords: weight cutting, sports athletes, competitive sports

Introduction

Combat sports also referred to as fighting sports, are weight class contact sports in which two individuals engage in one-on-one contest. Weight class sports are classified into weight categories depending on the sport being participated in, but ranges from under 53kg to over 120kg for males and under 47kg to over 120kg for females (World of Sport Science, 2013).

Combat sports include but not limited to Boxing, Danbe (African traditional boxing), Brazilian Jiu-Jitsu, Judo, Karate, Kokowa (African traditional wrestling), Kickboxing, Kunfu, Taekwondo, Mix Martial Arts (MMA), Muay-Thai and Wrestling (both Freestyle and Greco-Roman). As condition for competitions, all athletes in combat sports are required to attain a specific body weight before competing in a regulated bout (Cavey, 2021) [8]. The purpose of weight classification is to match athletes that are of a similar size to create an equal playing level and minimize the risk of injury between opponents (Jetton, Lawrence, Meucci, *et al*, 2013) [14]. According to Pettersson, Ekström and Berg (2013) [17], in order to promote fair and interesting contest and to reduce potential injuries caused by large differences in body mass and strength, combat-sport athletes compete in weight classes. So, rather than having a 60kg weight athlete compete against a 40kg weight athlete, athletes are classified according to their body weight during competitions. For example, at Tokyo 2021 Olympics, the International Olympic Committee (IOC) approved eight weight categories for men's boxing bouts and five weight classes for the women's boxing bouts.

The eight men's boxing weight classes were;

Flyweight (52kg), Featherweight (57kg), Lightweight (63, Welterweight (69kg), Middleweight (75kg), Light heavyweight (81kg), Heavyweight (91kg) and Super heavyweight (+91kg). Wikipedia, 2019)

In the IOC approved boxing weight classes, there are lower and upper weight limits. For example, the lower limit for featherweight (57kg) class is 52.05kg while the upper limit is 57.04kg. Any athlete whose weight falls within the range of 52.05kg to 57.04kg is eligible to compete in the featherweight class. Same is applicable to all the weight classes. However, experience has shown that before major competitions, some athletes entering for a particular weight class, for example featherweight class (52.05kg – 57.04kg) could;

1. Fall within the weight class range (52.05kg – 57.04kg). – Actual-weight. (AW).
2. Some could weigh one to two kilograms above the weight class range (58kg -59kg) -Moderately Overweight (MO).
3. While some could weigh three and more kilograms above the weight class range (60kg -67kg) - Extremely Overweight (EO).

Athletes involved in any of the above scenario are expected to take necessary actions within days to qualify to compete in the featherweight class because the limits provided are not merely guidelines, but are inflexible limits, hence inability of an athlete to meet the weight class limit, will disqualify the athlete from competition (World of Sports Science, 2013) [24].

So, the AW athletes will maintain their weights, while the MO and EO athletes will try to cut down their weights. The MO group will undertake moderate weight cut (MWC), while the EO group will indulge in extreme weight cut (EWC).

The extremely overweight athletes are the central focus of this research because they are the category of athletes who often indulge in extreme weight cutting (EWC) through the use of unorthodox means. A high percentage of athletes uses

unapproved or prohibited methods such as laxatives, diuretics, saunas, and plastic clothing to cut weight (Ciro, Aendria, Igor, *et al*, 2012) ^[9]. The unconventional methods used by this class of athletes to achieve weight cut are detrimental to health and performance (Barley, Chapman & Abbiss, 2019) ^[4, 5].

Ideally, athletes in MO and EO groups are supposed to compete in the Lightweight (60kg) class and Welterweight (69kg) class respectively, this is not always the case. Some athletes would want to cut down their weight drastically so as to compete in lower weight classes. By weight cutting, a larger athlete could reduce weight to participate at the high end of a lower weight class, by doing so, such athlete could gain a competitive advantage over opponents at the lower weight class (Cavey, 2021) ^[8]. Many athletes who compete in weight sensitive sports does see an advantage in competing in a lower weight, they do so with the expectation to encounter smaller and potentially weaker opponents (Alexander, 2017) ^[1].

Weight cutting consists of starving and dehydrating the body of food and water (Callum, 2018). Athletes often attempt to lose weight by not eating, limiting caloric or specific nutrients from the diet (Paula, Bernard, Crag *et al*, 2011) ^[16]. Meeting competition requirement is not the only reason athletes cut weight. Generally, athletes practice intentional weight reduction to improve athletic performance, mental alertness and body composition. Weight cutting is not a novel issue in sports, it has been an essential part of weight class sports for many decades (Zubac, Marusic & Kamincic, 2016) ^[26].

Extreme weight cutting is an unethical method of weight reduction. Many people do not know what extreme weight cutting is, how it is carried out, the dangers inherent in the practice and the reasons some athletes engaged in the practice. Extreme weight-cutting is a drastic and rapid weight reduction carried out by athletes few days or weeks to competition. Athletes who engaged in extreme weight cutting, use every means possible to shed weight before official weighing-in and once the athletes make the required weight, they would start to feed to replenish the weight loss to attain their normal weight (Franchini, Giro & Artioli, 2012) ^[9, 13], by this practice the athletes would gain weight and size advantage over athletes in the lower weight class.

An athlete is assumed to be involved in extreme weight cutting where such athlete cuts three and above kilogrammes of weights within few days or weeks to competition. Extreme weight cutting is characterized by transitory weight loss of at least 5-8% of body weight within few days (Morteza, Lucianne, Babak & Robert 2015) ^[15]. It involves the use of extreme weight cutting measures like water loading, saunas, increased exercise, fluid restriction, vomiting, laxatives, diet pills, diuretics, and spitting to achieve (Artioli, Gualano, Franchini, *et al*, 2010) ^[2] Other drastic methods of weight cutting are: reduced liquid ingestion; reduced carbohydrate and fat intake; use of blouses and plastic suits; wearing multiple layers of clothes and sitting in warm or heated rooms; jogging under the sun while wearing sweat suits; purging and induced vomiting; wrapping the body with blankets while wearing sweat suit when asleep at night; Shaving and Spitting regularly (Franchini *et al*, 2012) ^[13].

There are also other potential risks associated with extreme weight-cutting, including hormonal imbalances, changes to insulin sensitivity, bone loss and suppressed immune

function (Franchini *et al*, 2012) ^[13]. Previous researchers have found weight-cutting to influence testosterone, growth hormone, sex hormone-binding globulin, growth-hormone binding protein, cortisol and insulin production. Such changes, have been proposed to potentially influence bone mineral density, adolescent development and blood glucose regulation (Barley, Chapman, Gruppy & Abbis 2017) ^[3]. Diuretics are prohibited by the World Anti-Doping Agency (WADA), its use for any purpose will lead to disqualification (Reale, Slater & Burke, 2017) ^[18]. The additional stress & of the athlete to maintain competitive focus prior to the event (World of Sports Science, 2013) ^[24]. Majority of athletes, across multiple combat sports and disciplines engage in some form of weight cutting to compete, regardless of age, gender, experience level or level of competition (Connor & Egan, 2019; Giro, Aendria, Igor *et al*, 2015) ^[10].

Extreme weight cutting is universally practiced by all athletes in weight sensitive sports, the practice of dehydrating the body to shed weight in a short space of time is an issue that affects all combat sports, right up to the highest levels (Marvin, 2017). The Nigerian combat sports athletes are also involved in the practice of extreme weight cutting. Observations and experience during the last three National Sports Festivals and Youth Games organized in Nigeria, (Garden City Game 2011, Eko 2012 and Abuja 2018), were brought into focus. There were several unreported cases of athletes being stretched out from competition arena and taken to medical centers as a result of complications arising from extreme weight cutting. Many were disqualified because they could not make their weights.

Purpose of the Study

1. The objectives of this study were to determine: Whether extreme weight cutting can lead to positive competitive sports performance as assumed by some athletes who indulged in the unethical practice. And
2. to determine how wide spread extreme weight cutting is practiced among Nigeria combat sports athletes

Scope of the Study

This study investigated the effects of extreme weight cutting on competitive sports performance among combat sports athletes in Nigeria, using Delta State combat sports athletes who participated in the 20th National Sports Festival as a case study. The study was limited to male and female amateur combat sports athletes of age 17 to 28 years old.

Research Questions

The following research questions will guide this study.

1. What is the competitive sports performance of combat sports athletes who are in their actual weight (AW) during the competition?
2. What is the sports competitive performance of athletes who were involved in moderate weight cut (MWC) during the competition?
3. What is the sports competitive performance of the athletes who were involved in extreme weight cutting (EWC) during competition?
4. What is the difference in competitive sports performance of combat sports athletes who are in their actual weight (AW) and those who indulge in moderate weight cut (MWC) during the competition?

5. What is the difference in competitive sports performance of combat sports athletes who are in their actual weight (AW) and those who engaged in extreme weight cut (EWC) during the competition?
6. What is the difference in competitive sports performance of combat sports athletes who were involved in moderate weight cut (MWC) and those who engaged in extreme weight cut (EWC) during the competition?
7. Which weight type (Actual Weight, Moderate Weight Cut and Extreme Weight Cut) among combat sports athletes have the best competitive sports performance during the competition?
8. What is the percentage of combat sports athletes who were involved in weight cut, and
9. What percentage indulged in extreme weight cut?

Hypothesis

The following hypothesis tested using t-test at 0.05 level of significant.

1. There is no significance difference in competitive sports performance of combat sports athletes who indulge in extreme weight cut (EWC) and the combat sports athletes who are in their actual weight (AW) during the competition.
2. There is no significance difference in the competitive sports performance of combat sports athletes who are in their actual weight (AW) and the combat sports athletes who engaged in moderate weigh cut (MWC) during the festival.
3. There is no significance difference in competitive sports performance of combat sports athletes who engaged in moderate weigh cut (MWC) and the combat sports athletes who indulged in extreme weigh (EWC) during the competition.

Presentation and analysis of data

Research Question 1

What is the difference in competitive sports performance of combat sports athletes who are in their actual weight (AW) and those who engaged in moderate weight cut (MWC) during the competition?

Table 1: Mean and standard deviation scores or competitive sports performance of actual weight and moderate weight cut combat sports athletes

Weight Type	N	Mean	SD	Mean Difference
Actual Weight (AW)	65	1.40	1.37	
Moderate Weight Cut (MWC)	45	1.36	1.19	0.04

Results displayed in Table 4.1 shows that the mean scores of combat athletes with actual weight was 1.40 while the mean scores of combat sports athletes with moderate weight cut was 1.36. This shows a mean difference of 0.04. This implies that combat sports athletes with actual weight slightly perform better than those with moderate weight cut.

Research Question 2

What is the difference in competitive sports performance of combat sports athletes who are in their actual weight (AW) and those who indulge in extreme weight cut (EWC) during the competition?

Table 2: Mean and standard deviation scores or competitive sports performance of actual weight and extreme weight cut combat sports athletes

Weight Type	N	Mean	SD	Mean Difference
Actual Weight (AW)	65	1.40	1.37	
Extreme Weight Cut (EWC)	40	.80	1.30	0.60

Results displayed in Table 2 shows that the mean performance/scores of combat athletes with actual weight was 1.40 while combat sports athletes with extreme weight cut was 0.80. This shows a mean difference of 0.60. This implies that combat sports athletes with actual weight performed better than their colleagues with extreme weight cut.

Research Question 3

What is the difference in competitive sports performance of combat sports athletes who are moderately overweight (MO) and the combat sports athletes who are extremely overweight (EO) during the competition?

Table 3: Mean and standard deviation scores or competitive sports performance of moderate and extreme weight cut combat sports athletes

Weight Type	N	Mean	SD	Mean Difference
Moderate Weight Cut (MWC)	45	1.36	1.19	
Extreme Weight Cut (EWC)	40	.80	1.30	0.56

Table 3 reveals that the combat sports athletes with moderate weight Cut had mean competitive sports performance of 1.36 while their counterparts with extreme weight cut had a mean competitive sports performance of .80. This shows a mean difference of .056. This suggests that combat sports athletes with moderate weight cut performed better than those with extreme weight cut.

Research Question 4

Which weight type (Actual Weight, Moderate Weight Cut and Extreme Weight Cut) among the combat sports athletes has the best mean competitive sports performance during the competition, that is has the best performance?

Table 4: Mean and standard deviation scores or competitive sports performance of actual weight, moderate and extreme weight cut combat sports athletes

Weight Cut	N	Mean	SD
Actual Weight (AW)	65	1.40	1.37
Moderate Weight Cut (MWC)	45	1.36	1.19
Extreme Weight Cut (EWC)	40	.80	1.30

As shown in Table 4, combat sports athletes with actual weight had mean competitive sports performance of 1.40 while those with moderate and extreme weight cuts had 1.36 and .80 respectively. This shows that those with actual weight had the highest mean performance/score while those with extreme weight cut had the least.

Research Question 5

What percentage of the combat sports athletes were involved in weight cut during the competition? A total of 150 combat sports athletes were surveyed during the competition, 45 were indulged in moderate weight cut while 40 undertook extreme weight cut, therefore the total

numbers of athletes involved in weight cut are; $45+40 = 85$. 85% of $150 = 85/150 \times 100/1 = 56.67\%$
 This shows that nearly 57% of the combat sports athletes were involved in weight cut during competition.

Research Question 6

What is the percentage of combat sports athlete indulged in extreme weight cut? The percentage of those involved in extreme weight cut is; 40% of $150 = 40/150 \times 100/1 =$

26.67% . this shows that nearly 27% of combat sports athletes were indulged in extreme weight cut.

Hypothesis 1

There is no significance difference in the competitive sports performance of combat sports athletes who are in their actual weight (AW) preceding the competition and the combat sports athletes who are pre-camp moderately overweight (OM) during the festival.

Table 4.5: T-test Comparison of Mean Competitive Sports Performance/Scores of Combat Sports Athletes with Actual Weight and Those with Moderate Weight Cut.

Source of variation	N	Mean	SD	df	t-cal	P-value	Decision
Actual Weight (AW)	65	1.40	1.37				Not Significant
				108	.18	.860	
Moderate Weight Cut (MWC)	45	1.36	1.19				

The t-test result displayed in Table 4.5 indicates that the mean performance score of combat sports athletes with actual weight (Mean = 1.40) was not significantly different from mean performance score of those with moderate weight cut (Mean = 1.36), $t(df, 108) = .18, p = .860$. Since the p-value was greater than 0.05 level of significance, the null hypothesis was not rejected.

Hypothesis 2

There is no significance difference in competitive sports performance of combat sports athletes who are in their actual weight (AW) and those who indulge in extreme weight cut (EWC) during the competition.

Table 4.6: T-test Comparison of Mean Competitive Sports Performance/Scores of Combat Sports athletes with Actual Weight and Those with Extreme Weight Cut.

Source of variation	N	Mean	SD	df	t-cal	P-value	Decision
Actual Weight (AW)	65	1.40	1.37				Significant
Extreme Weight Cut (EWC)				103	2.22	.028	
	40	.80	1.31				

The t-test result displayed in Table 4.6 shows that the mean performance score of combat sports athletes with actual weight (Mean = 1.40) was significantly different from mean performance score of those with extreme weight cut (Mean = .80), $t(df, 103) = 2.22, p = .028$. Since the p-value was less than the stipulated 0.05 level of significance, the null hypothesis was rejected.
 This implies that combat sports athletes that did not cut their weight during competition were more effective than those

that had extreme weight cut before entering the competition.

Hypothesis 3

There is no significance difference in competitive sports performance of combat sports athletes who moderately overweigh (MO) preceding the competition and the combat sports athletes who are pre-comp extremely overweight (EW) during the competition.

Table 4.7: T-test Comparison of Mean Competitive Sports Performance/Scores of Combat Sports Athletes with Moderate Weight and Those with Extreme Weight Cut.

Source of variation	N	Mean	SD	df	t-cal	P-value	Decision
Moderate Weight Cut (MWC)	45	1.36	1.36				Significant
				83	2.05	.043	
Extreme Weight Cut (EWC)	40	.80	1.31				

Table 4.7 shows that the mean performance score of combat sports athletes with moderate weight cut (Mean = 1.36) was significantly greater than the mean performance score of those with extreme weight cut (Mean = .80), $t(df, 83) = 2.05, p = .043$. The null hypothesis which stated that the two groups will not differ significantly, was therefore rejected since the p-value of 0.043 was less than 0.05. This suggests that during competitive sports, combat sports athletes that cut weight moderately before the competition perform better than those that extremely cut weight.

Discussion of findings

The performance of combat sports athlete who indulged in extreme weight cut preceding the competition.

Table 4.1: which are the mean plots of competitive Sports Performances by Weight Type, indicated that the combat sports athletes who indulged in extreme weight cut preceding the competition has the least performance, with mean score of .80. this is in agreement with opinion of (Barley, Iredale, Chapman *et al*, 2016) [6]; Morteza, Lucianne, *et al* 2015) [15]; Lambert & Jones 2010); Coswig, Miarka, Pires and Silva 2018) [11, 12]; Carl, 2017) [7]; Zubac, *et al*. 2016) [26]; Franchini, *et al*, 2012) [13], that Significant

weight-cutting could compromise competitive sports performance.

The result does not support the assumption among some combat sports athletes, that extreme weight cut gives athletes competitive advantage over opponents at the lower weight class (Cavey, 2021; Alexander, 2017)^[11].

Performance of combat sports athletes who were involved in moderate weight cut preceding the competition

Same table 4.1: which are the mean plots of competitive Sports Performances/scores by weight type indicated that the combat sports athletes who were involved in moderate weight cut preceding the competition performed far better than the athletes who indulged in extreme weight cut. With a mean score of 1.36. This is in agreement with Franchini *et al*, (2012)^[13], who stated that findings have shown that performance is not affect by a weight cut range of one to two kilogrammes.

Performance of combat sports athletes who are in their actual weight preceding the competition.

In same table 4,1: which are the plots of the scores of athletes by weight type, the actual weight group, has the highest mean score/the best competitive sports performance. This group did not cut weight, they competed in their everyday weight, with full body hydration, their high performance is in line with a position paper issued by Convertino, Armstrong, Coyle, *et al*, (1996), on behalf of American College of Sports Medicine, in which they stated that adequate fluid replacement helps maintain hydration and, therefore, promotes optimal physical performance of individuals participating in regular physical activity.

Comparison of the performances of the three weight types

The performance of the AW, MWC, and the EWC, as show in table 4.1., showed that the AW has the highest mean score of 1.40 followed by the MWC, with mean score of 1.36, while the extreme the EWC, is in a distance bottom with.80 mean score. This was better illustrated in table 4.4, which showed the Mean and Standard Deviation on Competitive Sports Performance of AW, MWC and EWC Combat Sports Athletes. All showed that extreme weight cutting does not lead to optimal competitive sports performance of combat sports athletes, thus further reinforcing the views of Paula, Bernard, Craig, *et al* (2011)^[16], who opined that, methods used to cut weight compromise the ability of the athlete to compete at an optimal level.

Percentage of athletes involved in weight cut

From data analysis, it is shown that nearly 57% of the combat sports athletes were involved in weight cut during the competition. This is an indication that weight cutting is practiced among Nigeria combat sports athletes, this is in line with the position of Connor and Egan, (2019)^[10]; Ciro, Aendria, Igor *et al*, (2015)^[10], who opined that majority of athletes, across multiple combat sports and disciplines engage in some form of weight cutting to compete.

Percentage of athletes indulged in extreme weight cut.

From data analysis, it is shown that approximately 27% of combat sports athletes were indulged in extreme weight cut

during the competition, indicating that Nigeria combat sports athletes also engaged in acute weight loss to qualify to compete in lower weight classes, affirming the views of Marvin, (2017), who stated that extreme weight cutting is universally practiced by all athletes in weight sensitive sports right up to the highest levels.

Conclusion

Based on the findings of this study, the following conclusions were made:

1. Combat sports athletes who enter a sports competition in their actual weight (AW) have the highest mean competitive sports performance. That is, they have optimal performance during the sports competition.
2. Combat sports athletes who cut one to two kilogrammes of weight (MWC) have a slightly lower mean competitive sports performance to that of the actual weight athletes. That is to say that their performance is almost at par with the performance of the AW athletes.
3. Combat sports athletes who cut three kilogrammes and above of weight beyond the weight class range (EWC), have the lowest mean competitive sports performance, which means that they performed poorly during the sports competition.
3. There is a significant relationship between combat sports athlete who competed in their AW and combat sports athletes who were involved in MWC.
4. There is no significant relationship between combat sports athletes who competed in their AW and combat sports athletes who were indulged in EWC.

Recommendations

1. Athletes should not indulge in acute weight cut preparatory to sports competition, because doing so will compromise their performance
2. Coaches, athletes' trainers should plan sports competition participation around the weight class range of their athletes or at most should not allow their athletes to cut more than two kilogrammes above their weight class limit.
3. Sports administrators should monitor their athletes during camping and ensure that none is involved in extreme weight cutting.
4. Combat sports federations should ban acute/extreme weight cut because, it is an unethical practice and does not promote optimal sports performance.

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