

Alarming weight cutting behaviours in mixed martial arts: a cause for concern and a call for action

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Some nutritional practices in mixed martial arts (MMA) are dangerous to health, may contribute to death, and are largely unsupervised. MMA is a full contact combat sport (often referred to as cage fighting) that emerged to western audiences in 1993 via the Ultimate Fighting Championship (UFC). MMA is one of the world's fastest growing sports and now broadcasts to over 129 countries and 800 million households worldwide.

Underpinning the focus on weight controlling practices, lies MMA's competition structure of 11 weight classes (atomweight, 47.6 kg; strawweight 52.2 kg; flyweight, 56.7 kg; bantamweight, 61.2 kg; featherweight, 65.8 kg; lightweight, 70.3 kg; welterweight, 77.1 kg; middleweight, 83.9 kg; light-heavyweight, 93 kg; heavyweight, 120.2 kg; super-heavyweight, no limit) that are intended to promote fair competition by matching opponents of equal body mass. Athletes aim to compete at the lowest possible weight, usually achieved by rapid weight loss methods reliant on acute/chronic dehydration (eg, saunas, sweat suits, diuretics, hot baths, etc). Weigh-in occurs on the day before (24–36 h prior) competition therefore permitting athletes what is 'perceived' as sufficient time to rehydrate and refuel.

Although limited accounts exist of weight-making practices in MMA,¹ athletes have tested positive for diuretics, failed to make weight, and have withdrawn from contests due to adverse effects of weight cutting for example, nausea, vomiting, headaches, cramping, seizures, fainting, flu-like symptoms.² In September 2013, Brazilian MMA athlete Leandro Souza died in a sauna after attempting to lose 20% of body mass

(approximately 15 kg) in 7 days. Such extreme dehydration and chronic use of non-steroidal anti-inflammatory drugs (NSAIDs) also resulted in high-profile fighters hospitalised (and forced to retire) with kidney disease.²

WHAT IS THE EXTENT OF RAPID WEIGHT LOSS?

We recently surveyed UK MMA athletes (n=30), spanning five weight classes from flyweight to welterweight, and discovered an alarming culture of weight making. These athletes lost $9 \pm 2\%$ of body mass in the week before competition and a further $5 \pm 2\%$ in the final 24 h before weigh-in. Such losses are greater than in other combat sports,³ likely due to the requirement to possess higher lean mass for 'grappling' and the significant time between weigh-in and competition.

PREVALENCE OF RAPID WEIGHT LOSS METHODS AND NOVEL DEHYDRATION METHODS

In total, 67% of athletes engaged in a previously unreported practice of 'water-loading', whereby athletes reduce sodium intake and overdrink water (eg, 20–23 L over 3 days), in the belief it will trigger a 'flushing mode' to induce excessive urine production. Several athletes (17%) reported the use of solutions to increase sweating by increasing circulation (eg, Sweet sweat) or by blocking the pores (eg, Albolene). Athletes (37%) consumed prescription and over-the-counter diuretics and 13% utilised intravenous lines (1 self-administered, 3 administered by a physician) and glycerol to encourage rehydration post-weigh-in. In total, 73% of athletes consumed nutritional supplements during weight-cutting, though 61% did not know whether supplements were tested for banned substances. Since 1 July 2015, all UFC fighters have been subject to random drug testing procedures and from 1 October, use of intravenous drugs following weigh-ins will not be permitted (both overseen by USADA). One hundred per cent of the MMA athletes engaged in complete fasting or low carbohydrate diets in the final 3–5 days prior to weigh-in thereby promoting 'relative

energy deficiency'.⁴ Only 20% of athletes obtained dietary advice from qualified sports dietitians/nutritionists, with the majority of advice provided from coaches, peers and internet sources.

BRAIN TRAUMA RISK IN MMA

The effects of dehydration on brain trauma risk⁵ is especially concerning for MMA given that, unlike boxing, head trauma can occur after an athlete has lost consciousness. On average, 2.6 head strikes are delivered after an opponent has lost consciousness which could potentially increase the risk of traumatic brain injury.⁶

Perhaps most concerning, UK MMA has no regulatory body that ensures the health, safety and well-being of athletes. UK MMA events are not covered by formal antidoping procedures. Similar to recent calls from the IOC^{7, 8} and the Association of Ringside Physicians,⁹ we suggest MMA regulations need changing and recommend the following:

- ▶ Introduction of more weight classes and restructuring of current weight categories to reduce differences in absolute weight, especially between lower weight categories, for example, <3 kg as opposed to typical >4 kg.
- ▶ Policies focusing on 'check' weigh-ins and maximal weight regain allowances following weigh-in). In August 2015, the Arkansas State Athletic Commission has commissioned a maximal weight regain allowance of 7.5% following weigh-in.
- ▶ Scheduling weigh-ins 24 h or less before competition alongside minimal hydration acceptable limits.
- ▶ Antidoping procedures for domestic championship bouts in accordance with WADA policy.
- ▶ Implementation of educational packages to support MMA athletes in making weight safely.

We encourage the MMA community to embrace quality research, injury surveillance¹⁰ and health monitoring. This will provide the basis for appropriate policy to ensure the safety of MMA athletes.

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