

## MANAGEMENT OF ATHLETES' BODY WEIGHT IN THE PREPARATION OF ATHLETES FOR SPORTS COMPETITION

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### ABSTRACT

*The overall goal of this study is to provide an insight into the management of athlete body weight for effective and efficient sporting competition. Thus, body weight varies from one individual to another and management also differs. It was discovered that overweight, underweight are types of body weight. It was therefore concluded that, unsafe weight management practices such as illegal ingestion of ergogenic and dietary aids can compromise athletic performance during competition and negatively affect health. It was therefore recommended that proper monitoring of athletes body weight; weight management in athletes with eating disorders and disordered eating, maintaining body weight with diet and exercise, weight gain and weight loss are the common practices to manage athlete body weight to achieve optimum sports performance in the preparation of athletes for competition.*

**Keywords:** Body weight, management and competition.

### INTRODUCTION

Over the years, management of athlete weight has been a major concern to coaches, trainers and nutritionist, particularly during and after competition. Weight management is a long-term approach to a healthy lifestyle. It includes a balance of healthy eating and physical exercise to equate energy expenditure and energy intake. Therefore Optimizing body weight is an important performance determining factor for athletes involved in many sport. It is on this premise that bodyweight is used in biological and medical sciences to describe the earth's gravitational pull on an organism's body. Body weight is measured in kilograms throughout the world, although in some countries it is measured in pounds or stones. Consequently, body weight of a person is theoretically the weight of the person without any items on. Body weight (which is an expression of force that includes gravity) is expressed in newtons.

**Table 1. Average Weight around the world**

Region	Adult Population (Millions)	Average Weight	Overweight Population/ Total Population
Africa	535	60.7kg	28.9%
Asia	2,815	57.7kg	24.2%
Europe	606	70.8kg	55.6%
Latin America and the Caribbean	386	67.9kg	57.9%
North America	263	80.7kg	73.9%
Oceania	24	74.1kg	63.3%
World	4.630	62.0kg	34.7%

(Serah, David, Phil, John, Gretchen & Ian, 2012)

On the other hand, management of body weight is used for both healthy weight loss and weight gain. To this end, some athletes require building of body mass, muscle and power, while others need strength and flexibility on a small frame, an athlete who had the goal of weight loss as a top or flyer can then switch to weight gain and muscle building as a base in a pair or group. Sherwood, Jeffery, French, Hannah and Murray (2000) asserted that weight and weight change are determined by multiple factors-physical activity, fat intake and total energy intake which appear important for the successful long-term control of body weight. Lee and Paffenbarger(1992) found out that a loss and gain in weight is associated with increased mortality from any causes and from coronary heart disease. The overall goal of this study is to provide an insight into the management of athletes body weight in the preparation of athlete's for sports competition.

## **TYPES OF BODY WEIGHT**

The following are types of body weight:

### **Overweight**

Overweight is generally defined as having more body fat than is optimally healthy. Being overweight is a common condition, especially where food supplied are plentiful and lifestyles are sedentary. According to World Health Organization (2003) excess weight has reached epidemic proportions globally, with more than 1 billion adults being either overweight. Increases have been observed across all age groups. A healthy body requires a minimum amount of fat for the proper functioning of the hormonal, reproductive and immune systems, as thermal insulator as shock absorption for sensitive areas and as energy for future use. But the accumulation of too much storage fat can impair movement and alter the appearance of the body. Overweight is defined as a body mass index (BMI) of  $25\text{kg/m}^2$ - $29\text{kg/m}^2$  (WHO, 1999).

The generally acceptable view is that being overweight causes similar health problems to obesity, but to a lesser degree. It is estimated that the risk of death increases by 20 to 40 percent among overweight people (Adams, Schatzkin, Tamara, Harris, Victor, Traci, Ballard-Barbash, Hollenbeck, & Michael 2006). Framingham heart study found that being overweight at age 40 reduced life expectancy by three year (Peeters, Barendregt, Willekens, Mackenbach, Almamun & Bonneux, 2003).

Flegal (2007) however, found that the mortality rate for individuals who are classified as overweight (BMI  $29.9\text{kg/m}^2$ ) may actually be lower than for those with an "ideal" weight (BMI  $18.5$  to  $25\text{kg/m}^2$ ). Being overweight has been identified as a cause of cancer and is projected to overtake smoking as the primary cause of cancer in developed countries as cases of cancer linked smoking dwindle (Wanjenk, 2008). Psychological well-being is also at risk in the overweight individual due to social discrimination. However, children under the age of eight are normally not affected (Kirschenbaum, 2006). Being overweight does not increase mortality in older people (Flicker, McCaul, Hankey, Jamrozik, Brown, Byles & Osvaldo, 2010).

### **Underweight**

Underweight is a term describing a human whose body weight is considered too low to be healthy. The definition usually refers to people with a body mass index (BMI) of under  $18.5\text{kg/m}^2$  (National Heart, Lung and Blood Institute, 2012) or a weight 15 to 20% below that is normal for their age and heights (Mahan, 2000). A person may be underweight due to genetics (Indian Express, 2010). Again, UT South Western medical centre (2007) stressed those underweight results from metabolism or lack of food frequently due to poverty.

Being underweight may be associated with certain medical conditions, including hyperthyroidism, cancer or tuberculosis (Milas & Walker, 1997). The authors emphasised that people with gastrointestinal or liver problems may be unable to absorb nutrients adequately they further stressed that, people with eating disorders, such as anorexia nervosa are likely to become underweight.

## MANAGEMENT OF ATHLETES BODY WEIGHT

### Weight Gain

Weight gain is an increase in body weight. This can either be an increase in muscle mass, fat or excess fluids such as water. Muscle gain or weight gain can occur as a result of exercise or body building, in which muscle size is increased through strength training. If enough weight is gained by way of increased body fat deposits, one may become overweight which is generally defined as having more body fat (adipose tissue) than is optimally healthy. When the body weight gain is from muscle development, the gain is termed muscular hypertrophy.

Weight gain has a latency period. The effect that eating has on weight can vary greatly depend on the following factors:

- a. Energy (Calories) density of foods
- b. Exercise region
- c. Amount of water intake
- d. Amount of salt contain in the food
- e. Time of day eaten
- f. Age of individual
- g. Individual's country of origin (Flegal, Carroll, Cynthia, Odgen & Johnson, 2002).

Being fat is a common condition, especially where food supplies are plentiful and lifestyles are sedentary. As much as 64% of the United States adult population is considered either overweight or obese and this percentage has increased over the last decades (Flegal et al, 2002).

In regards to adipose tissue, a person generally gain fat – related weight by increasing food consumption, becoming physically inactive or both, or when energy intake exceeds energy expenditure (when the body is in positive energy balance), the body can store the excess energy in a dense, high energy form as fat. One pound of fat represents 3,500 kilo calories (Linda, 2012). So overtime, excessive energy intake and/or lack of exercise can contribute to fat gain and obesity. Weight gain is a common side effect of certain psychiatric medications (Newcomer, 2005).

### Weight Loss

Weight loss in the context of medicine, health or physical fitness is a reduction of the total body mass, due to loss in fluid, body fat or adipose tissue and lean mass, namely bone mineral deposits, muscle, tendon and other connective tissue. It can occur unintentionally due to an underlying disease or can arise from conscious effort to improve an actual or perceived overweight or obese state.

#### *Unintentional Weight Loss*

Unintentional weight loss occurs in many diseases conditions, including some very serious diseases such as cancer, AIDs and a variety of other diseases. Poor management of type 1 diabetes mellitus, also known as insulin – dependents mellitus (IDDM), lead to an excessive

amount of glucose and insufficient amount of insulin in the blood stream. This triggers off the release of triglycerides from adipose (fat) tissue and catabolism (breakdown) of amino acids in muscle mass, leading to a significant reduction in total body weight. Untreated type 1 diabetes mellitus can produce weight loss. In addition, weight loss is the reduction of fat and lean mass, fluid loss can be triggered off by illness such as diabetes, certain medications, lack of fluid intake or other factors. In addition to reduction in fat and lean mass, fluid loss exacerbates the risk of cachexia (Morley, Thomas & Margaret – Mary, 2006). Infection such as HIV may alter metabolism, leading to weight loss (Mangili, Murman, Zampini & Wanke, 2006).

### ***Intentional Weight Loss***

Intentional weight loss refers to the loss of total body mass through an effort to improve fitness and health, and/or to change appearance. Therapeutic weight loss in individuals who are overweight or obese, can decrease the likelihood of developing diseases such as diabetes, heart disease, high blood pressure, osteoarthritis and certain types of cancer (Butler, 2000).

Weight loss occurs when an individual is in a state of negative thermodynamic flux, when the body is exerting more energy (i.e in work and metabolism) than it is consuming (i.e from food or other nutritional supplements). It will use stored reserves from fat or muscle, gradually leading to weight loss. It is not uncommon for some people who are currently at their ideal weight to seek additional weight loss in order to improve athletic performance, and/or meet required weight classification for participation in sport. However, others may be driven by achieving a more attractive body image.

### **Monitoring Athletes Body Weight**

During pre-season activities that involve equipment that could increase sweat loss or prevent adequate cooling in warmer and more humid climates, body weight should be re-assessed at least daily due to increase risk of dehydration and heat related illness. Daily weighing, before and after exercise, can help identify excessive weight loss due to dehydration.

Active athletes in weight classification sports should not gain or lose excessive weight at any point in their training cycles. Athletes should attempt to maintain levels that are close to their weight goal when not competing and maintain their goal weight during competition excessive fluctuations, in body weight can negatively affect the body, including but not limited to changes in metabolic activity, fluctuations in blood glucose levels and muscle wasting (Byrd – Bredbenner, Beshgetoor, Moe & Berning, 2009). Athletes in weight classification sports should have individual monitoring plans, such assessments should be at least once per month in the off – season and at regular intervals, not to exceed once per-week, to monitor for fat fluctuations. (National Collegiate Athletes Association, 2008).

## **MAINTAINING BODY WEIGHT WITH DIET AND EXERCISE**

### **Diet**

To maintain good health and store off disease, a regular exercise programme should be combined with a dietary plan. The dietary plan should be developed to address the athlete's specific body weight and activity goals. Individual body weight and dietary needs should be discussed privately with trained nutritionist and weight management experts. Coaches, peers and family members should not provide information in diet, body weight or weight management practices should refrain from making comments on or participating in the monitoring of body weight. (Bonci, Bonci & Granger, 2008).

A safe and healthy dietary plan that supplies sufficient energy and nutrients should be maintained throughout the year. A healthy diet or meal plan provides adequate calories to achieve body weight goals, supply essential nutrients and maintain hydration. According to the United States Department of Agriculture (2009), food pyramid guide is one method that can be used to ensure adequate nutrient intake. Athletes should identify the appropriate food guide pyramid that describes food groups and the recommended number of daily servings per adult need to consume for essential nutrients.

Ergogenic and dietary aids should be ingested with caution and under advice of those knowledgeable about the requirements of sports and other governing organizations. The international Olympic Committee regulates supplements approved for use by athletes. Non – Muscle – building nutritional supplements to athletes at any time for the purpose of providing additional calories and electrolytes, as long as the supplements do not contain any substances banned. (National Collegiate Athletics Association, 2008). Athletes should be educated against taking any dietary or other supplements without first checking with the trainer or other health care provider who is familiar with the competitive regulations.

### **Exercise**

The exercise programme should not only train the athlete for his or her activity but should also help the person maintain overall physical fitness and wellness. Body weight may be maintained by pursuing an exercise regimen that matches a person's needs. The American College of sports medicine recommends 30 minutes of exercise, 5 days per week to remain healthy (Ehrmam, 2010); however if the goals are to facilitate weight and body fat loss. To maximize the metabolism of excess fat, one must participate in continuous, rhythmic aerobic exercise for a minimum of 30 minutes per exercise bout but no longer than 60 to 90 minutes, for at least 150 minutes per week (Lambert & Goedecke, 2003).

Body weight adjustments should be gradual, with no excessive restrictions or unsafe behaviours or products. On average, weight loss goals should be approximately 0.5kg to 0.9kg per week but should not exceed 1.5% of body weight loss per week (Horswill, 2009). The author stressed that a higher rate of weight loss indicates dehydration or other restrictive or unsafe behaviours that will negatively affect performance and health. 0.5kg of fat is equal to 3,500 kilocalories of energy; therefore, increases or decreases in calories to the level needed to maintain ideal lean mass will help to achieve body fat goals.

Weight management with physical conditioning periodization goals will assist athletes in reaching weight goals. Periodization involves manipulating training intensity and volume to yield specific performance outcomes. The best time for adjustments in weight is during the preparatory period, which occurs outside competition (National Collegiate Athletic Association, 2008). The main emphasis of the competitive period should be on performing the sport or activity with the body nearing its highest level of physical fitness.

### **WEIGHT MANAGEMENT IN ATHLETES EATING DISORDERS AND DISORDERED EATING**

Athletes competing in aesthetic sports had the highest indicators of eating disorders (Stoutjesdk & Jevne, 1993). Those who participated in weight matched sports also showed higher levels of disordered eating than athlete in non-weight – restricted sports (Husenblas & Carron, 1992). Athletes whose bodies differ from the “ideal” physique of the sport may also be at higher risk for developing disordered eating (Collegiate Spring Football League, 2008). Some experts have surmised that the demands of the athlete subculture may involve inherent risk for the development of unhealthy weight control behaviours. Subclinical eating disorders

in athletes have been associated with dieting to enhance appearance or improve health or dieting because someone (e.g, coach, peers) recommended it. (William,Sargeant & Dinstine, 2003).

Disordered eating in the mild and earliest stages may start simply as dietary plan to achieve a better aesthetic appearance or better performance. A common “diet” involves calories restrictions, but when those restrictions are taken to the extreme, there is reason for concern. Often, athletes seek weight loss or dieting advice from friends or teammates or simply follow the suggestions of others without fully understanding the importance of maintaining an adequate energy balance. Other times, athletes may adhere to the recommendations made by coaches without understanding the nutritional requirements of the sports (Bonci, Bonci & Granger 2008). The health care team should be in place to help athletes address disordered eating, behavior, and to assist in providing accurate and appropriate advice.

## CONCLUSION

Unsafe weight management practices can compromise athletic performance and negatively affect health.Managing weight in sports requires an understanding of several factors related to the sports and the athletes. Sports nutritionist must understand the physiological demands of the sports throughout the periodised training and competition plan. Gradual weight loss is often recommended, using mild energy restriction in combination with exercise related energy expenditure. Action plans to manipulate an athlete’s body weight should be established and managed using an interdisciplinary team approach, especially in the elite level. Practical approaches to weight management in athletes must be effective, sustainable and specific to the athlete’s physiology and psychology. Athletes are known to engage in controversial weight loss techniques (e.g training in fasted state, delaying recovery, eating less carbohydrate). Rather than dismissing these techniques completely, sports nutritionist, fitness trainers and other health care provider should help athletes modify and fine-tune these practices and make them safe.

## RECOMMENDATIONS

Based on the submissions above, the following recommendations were made:

1. Body composition should be used to determine safe body weight,
2. Individual body weight should be discussed privately with appropriate trained nutrition and weight management experts,
3. Active athletes in weight classification sports should not gain or loss excessive amount of body weight at any point in their training cycle,
4. Education of safe dietary and weight management practices should be communicated on a regular and planned basis,
5. Management of body weight should include both diet and exercise.

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