

## Management of Obesity: Implication For Aging Athletes

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**Abstract** - The overall goal of this study was to provide insight into the management of obesity in aging athletes. Obesity is seen as an imbalance in energy expended and energy intake and a leading cause of death worldwide with increasing prevalence in adults and children. It is also viewed as one of the most serious public health problems of the 21<sup>st</sup> century. It has been observed that diets, physical activities and medical options are ways of managing obesity for aging athletes. It was therefore concluded that physical activities, diets and medical management could reduce type-2 diabetes, coronary diseases, hypertension, respiratory disorders, gall bladder disease, certain types of cancers, cholesterol, disability and early death as consequences of obesity. It was recommended that developing and designing regular physical activities, diets, medical options are ways to manage obesity.

**Keywords:** Obesity, Aging Athletes, Physical activities, Diets & Medical

### I. INTRODUCTION

In today's health-conscious society, there is a growing awareness of obesity globally. For various reasons, many people are becoming not just overweight, but obese as well. Obesity and overweight have in the last decade become a global problem, back in 2005 approximately 1.6 billion adults over the age 15+ were overweight at least 400 million adults were obese and at least 20 million children under the age of 5 years were overweight (Medical News, 2004). It further maintained that, if the current trends continue by 2015 approximately 2.3 billion adults will be overweight and more than 700 million will be obese. Obesity is a concern because of its implication for the health of an individual as it increases the risk of many diseases and health conditions which includes: coronary heart diseases, type 2 diabetes, endometrial cancer, stroke, liver, gall bladder disease, sleep apnea, respiratory problems, osteo-arthritis and gynaecological problems (abnormal menses, infertility), these condition can cause or contribute to premature death and substantial disability (Medical News, 2014).

Obesity is caused by a positive balance between calorie intake and energy expenditure which determines a person's weight. If a person eats more calories than he or she burns (metabolizes), the person gains weight (the body will store the excess energy as fat) contrary the person loses weight (Jerry,2014).The most common cause of obesity are overeating and physical inactivity. Ultimately, body weight is the result of genetics, metabolism, environment, behaviour and culture. Haslam and James (2005) maintained that obesity was widely perceived as a symbol of wealth and fertility at other times in history and still in some parts of the world. They further stressed that obesity is a medical condition in which excess body fat has accumulated to the extent that it may have adverse effect on health, leading to reduce life expectancy increased health problem. People are considered obese when their Body Mass Index (BMI), a measurement obtained by dividing the person's weight in kilogram by the square of the person's

height in metres exceed  $30\text{kg/m}^2$  (World Health Organization, 2000).

Human physical performance is notably reduced with aging, although, the effects of aging are often compounded by disuse. The good news, however, is that, many of the diseases and infirmities exclusively attributed to aging are more accurately related to the effects of sedentary living. Sedentary seniors decline twice as fast as their active counterparts and their highest level of conditioning affects their overall level of decline (Hill, 2001). A growing subset of aging athletes has maintained higher functional capacity and quality of life through exercise. Exercise improves quality of life of aging athletes by decreasing body fat and obesity rates, increasing muscle strength, improving balance, gait and mobility, decreasing the likelihood of falling, improving psychological health, reducing arthritis pain and reducing the risk of developing coronary heart disease, hypertension, osteoporosis, cancer and diabetes (Hunter, McCarthy & Bamman, 2004). The overall goal of this paper is to provide insight into the use of physical activities, diet and medical as ways to manage obesity.

### Classes of Obesity

World Health Organization (2000) submitted that Body Mass Index is an indicator to classify obesity. Therefore, body mass index is the individual's body mass divided by the square of his or her height, typically expressed in metric.

| BMI         | Classes           |
|-------------|-------------------|
| 30.0 -34.9  | Class I obesity   |
| 35.0 – 49.9 | Class II obesity  |
| ≥ 40.0      | Class III obesity |

### Management of Obesity

Obesity can be managed through *Medical Management*, *Physical Activities Management* and *Diets Management*.

### Medical Management

Medications should only be considered for patients with BMI greater than 30 or greater 27 if they have co-morbidities

and have failed to lose weight on a programme of diet, exercise and behaviour therapy (Arome, 1998) sibutramine is a novel agent that inhibits the reuptake of serotonin, norepinephrine and dopamine (Wechster & Leopold, 2003). It does not stimulate secretion of serotonin. Its effects on food intake are caused by increased noradrenergic and serotonergic activity in the central nervous system (Berke & Morden, 2000). Sibutramine has been shown to reduce energy intake, specifically during lunch time (Palan & Wadden 2002). There have been multiple studies done to examine whether adding medications will improve the results of lifestyle modification. In a study done with sibutramine, results showed a weight loss of 3 to 9kg greater than placebo when both interventions were combined with a low intensity programme of lifestyle modification (Phalan & Wadden, 2002).

Bariatric surgery can be an option for some obese individual's if the patient has a BMI  $\geq 40\text{kg/m}^2$ , BMI of 35 to  $40\text{kg/m}^2$  who have a high risk of co-morbid conditions or have significantly obese related physical conditions that interfere with their lifestyle. There are two procedures commonly performed. One is vertical banded gastroplasty, in which a small pouch with a restricted outlet is constructed along the lesser curvature of the stomach. The second is gastric bypass, in which a proximal gastric pouch is constructed whose outlet is a y-shaped limb of the small intestine (Fujioka, 2002). Life long medical surveillance is necessary after surgical therapy (Wechsler & Leopold, 2003). The risk of death following bariatric surgery is between 1% and 2% in most series, but is significantly higher in patients with respiratory insufficiency of obesity (Sugerman, 2001).

### Physical Activities Management

Physical activity provides protection against the health risks of obesity and primarily by reducing or reversing the development of a progressive disease process known as insulin-resistance syndrome or syndrome x. This syndrome is closely associated with obesity and is characterized by the clustering in insulin resistance and hyperinsulinemia, dyslipidemia essential hypertension, glucose intolerance and an increase risk of non-insulin dependent diabetes mellitus and cardiovascular disease (Timar, Sestetier & Levy, 2000). Prior to describing the moderating influence of physical activities, the general mechanisms underlying insulin resistance syndrome will first be described.

While research is still accumulating on the specific mechanism, the general disease process is related to the presence of abdominal body fat particularly visceral fat (Campbell & Kraeger, 1997). Abdominal body fat is characterized by increase responsiveness to lipoprotein lipase. Owing to its high lipolytic activity abdominal adipocytes readily release Free Fatty Acid (FFA) into the circulation. These FFA are carried directly to the liver through the portal Circulation Density where they are converted into Very Low Density Lipoprotein (VLDL) and ultimately LDL cholesterol. The high level of FFA may also lead to enhanced lipid oxidation and reduce glucose oxidation. These changes can result in sensitivity to insulin. The increased levels of FFA in

the portal circulation also act directly to inhibit insulin clearance by the liver resulting in hyperinsulinemia. High levels of insulin in the presence of elevated glucose tend to promote reduction in insulin sensitivity and hasten the development of non insulin dependent diabetes mellitus. The increase in blood pressures as insulin is thought increases sodium retention in the kidney. Thus, high level of abdominal obesity is directly related to dyslipidemia (elevated level of LDF and triglycerodes), hypertension, hyperinsulinemia, reduced glucose sensitivity and ultimately non-insulin dependent diabetes mellitus. Physical activity reduces beneficial metabolic changes that limit the progression of this underlying disease process. The major benefit of physical activity is that it leads to specific reduction in the levels of abdominal obesity (Ross & Janssen, 1999). The enhanced lipolytic activities of these fat cells allow fatty acids to be released and metabolized more readily than fat depots. While overall weight loss from exercise is limited, studies have indicated that changes in abdominal fat levels can occur without corresponding weight loss or total fat loss. Studies have also demonstrated that physical activity has a direct effect on improving overall metabolic profiles (e.g normalization of insulin levels and improved glucose homeostasis). In a review of Kelly and Goodpaster (1999) studies, the improvement in insulin action were found to occur without concomitant changes in weight or body composition while there appear to be some chronic adaptations that occur as a result of regular exercise performed over a period of time, there are also observations that indicate that some benefits are related to the acute effects following individual bouts of activity.

### Diets Management

Diets management of obesity and overweight is the cornerstone of weight loss therapy. Most of the dietary regimens proposed weight loss focus on energy content and macronutrient composition. It is the energy content that determines the efficiency of the dietary regimens. Obesity treatment guidelines issued by the National Institute of Health (NIH) recommended that persons who are overweight or who have class I obesity and who have two or more risk factors should reduce their energy intake of 500kcal/day (National Institute of Health, 1998). Person with class II and Class III obesity should strive for 500 – 1000kcal/day reduction. With a reduction of 500kcal/day energy intake, a weight reduction of 0.5g/week can be achieved.

### Type of Diets

In general, there are four types of dietary regimens used in the treatment of obese persons. These are: Low-calorie diet (LCD); Low – fat diet; Low – carbohydrate diet; and Very low – calorie diet (VLCD).

### Low-calories Diets

Low calories diets are high in carbohydrate (55-60%), low in fat (less than 30% of energy intake), and high in fibre and have a low-glycemic index. Alcohol and energy-dense snacks should be avoided. LCD has been shown in 34 randomized

trials to reduce body weight by 8% during 3-13 month period (Strychar,2006).Overweight or obese patients tend to underestimate their energy intake. To help them overcome this, portion controlled or prepackaged meals that make up the required energy intake is available. Replacement meals are available as drinks, nutrition bars, or prepackaged meals. A 4 – year study demonstrated weight loss improvement in blood sugar and blood pressure for persons taking meal replacements diets (Hechtner-mors, Distchuneit, Johnson, Suchard & Adler, 2000).

#### **Low-Fats Diets**

These diets reduce the daily intake of fat to 20 – 25% of total energy intake. For a person on a 1500 calorie diet, this translated to 30-37g of fat, which can be counted using food label from packages. Alternatively, a dietician can provide the person with a specific menu plan that has reduced fat. According to a meta-analysis of 16 trials, low-fat diet used over 2-12 months resulted in mean weight loss of 3.2kg and improved cardiovascular risk factors (Astrup, Ryan, Grunwald, storgaard, Saris, Melanson & Hill, 2000).

#### **Low-carbohydrate Diet**

The carbohydrate content of the diet is an important determinant of short-term (less than 2 weeks) weight loss. Low-carbohydrate (60-150g of carbohydrate/day) and very low carbohydrate diet (0 to < 60g) have been popular for many years. Glycogen utilization occurs when carbohydrate intake is restricted. When the carbohydrate intake is less than 50g/day, ketosis will develop from glycogenolysis, resulting in fluid loss. Many of the current low-carbohydrate diets (e.g. Atkins diet) limit carbohydrate intake to 20g/day but allow unrestricted amounts of fat and protein. A meta-analysis of five trials found that weight loss at 6 months favouring low-carbohydrate over low-fat diet is not sustained at 12 months (Nordmann, Nordmann, Briel, Keller, Yancy, Brehm & Bucher, 2006).

#### **Very Low-calorie Diet (VLCD)**

VLCDs are diets with energy content of 200-800kcal/day. Diets below 200/cal/day are starvation diets. VLCDs are not recommended for general use, as there are significant adverse effects such as electrolyte unbalance, low blood pressure and increased risk of gallstones. It needs to be supervised by trained medical personnel. In a meta-analysis of 80 weight loss studies, mean weight loss of 5 to 8.5kg (5-9%) was observed during the first 6 months from interventions involving a reduced-energy diet and/or weight loss medications with weight plateaus at approximately 6 months, with maintenance of 3-6kg (3-6%) of weight loss at 48 months (Franz, VanWormer & Crain, 2007). A randomized controlled trial comparing four weight loss diets with different compositions of fat, carbohydrate and protein found no difference in outcomes, with a 2 to 4kg weight loss with all diets after a year (Sacks, Bary & Carey, 2009). They further maintained that after 2 years, all calories – restricted diets result in equal weight loss irrespective of the macronutrient composition. In contrast, all studies found that dietary adherence is an important determinant of weight loss (Strychar,2006). Thus, choosing a diet with a micronutrients

composition based on a subject's taste preference can achieve better compliance.

#### **Implication of Obesity to Aging Athletes**

Nearly 50 million adults or 27% of the adult population are obese and more than 108 million adults (61%) are either obese or overweight (U.S. Department of Health and Human Services, 2002). The Centre for Disease Control and Prevention reported between 1991 and 1998, obesity rate for U.S adults aged 60-69 years increased to 45% (Mokdad, Serdula, Dietz, Bowman, Marks & Koplan, 1999). Studies in aging athletes of both sexes find that body composition changes occur but overall measures of body composition (weight, percent intra-abdominal fat) are superior compared to age-matched sedentary control. Pollock, Mengelkoch & Graves (1997) measured body composition in 27 male aging track athletes and followed them for 20 years. Body weight remained stable in the male athlete who remained active, yet percent body fat increased by about 3% per decade. Ryan, Nicklas & Elahi (1996), van Pelt, Davy & Stevenson (1998) studied different groups of female aging athletes. They found that athletes had lower percent body fat and total fat mass than younger controls although both groups had body mass index (BMIs) of < 25kg/m<sup>2</sup>. The female aging athletes had increases in intra-abdominal fat with age, but were lower than in older controls. Subcutaneous fat did not increase with age in the older athletes.

Meanwhile, no specific studies on metabolic syndrome on aging athletes have been published. However, aging athletes have improved glucose tolerance, enhanced insulin sensitivity and lower waist-to-hip ratios compared to sedentary older adults. Seals, Hagberg, Hurley, Dalsky, Ehsari & Holloszy (1984) found that aging athletes (average of 60 years) had normal glucose tolerance ingestion) compared to older, untrained men. The aging athletes blood glucose and insulin levels were as low as the young (averagr of 60 years). Hagberg & Rogers, (1995) found out that endurance – trained master athletes (runners and triathletes with an average age of 63.5) had enhanced insulin sensitivity and a lower waist-to-hip ratio to sedentary older men. These data suggest regular endurance activity may prevent abdominal obesity and insulin resistance that are frequent in aging individual.

#### **CONCLUSIONS AND RECOMMENDATIONS**

Obesity in one of the killer diseases world-wide and it currently affects all ages. Many people consider obesity to be a cosmetic problem. Obesity increases the risk of many diseases and health conditions which includes: coronary heart disease, type 2 diabetes, certain type of cancer, hypertension, stroke sleep apnea, liver, gall bladder and a host of other diseases, this condition can cause or contribute to premature death or substantial disabilities. Most studies agreed that physical activities, diet and medical are ways to manage obesity.

It is hereby recommended that developing and designing exercise and diet plan that is right for fitness level and eating habit. A day should be set aside which will be called “obesity day”. This will go a long way to raise people's consciousness.

Medical management of obesity should be the last options. Aging athletes should make regular physical activities their daily routine.

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