

INTRODUCTION

Obesity has become one of the most important threats to human health worldwide. According to the data derived from the Third National Health and Nutrition Examination Survey, the prevalence of obesity in the United States of America is 31.1% in men and 33.2% in women. Regardless of the multiple efforts made to address this public health issue, the prevalence of obesity continues to rise(*Ogden et al., 2004*).

Abundant scientific evidence supports the associations between obesity and various disease including diabetes mellitus, hypertension, coronary artery disease, cancer, and sleep apnea(*Poirier et al., 2006*).

It should also be noted that the consequences of obesity extend beyond physical ailment and into the psychosocial as well as economic aspects of life(*Colditz, 1992*).

The most commonly used anthropometric method to diagnose obesity is the body mass index (BMI), which is calculated as an individual's weight in kilograms divided by the height in meters squared. This was first described in the 19th century by a Belgian mathematician who noticed that in people he considered to be 'normal frame', the weight was proportional to the height squared (*Quetelet, 1968*).

Visfatin, also known as pre B colonyenhancing factor PBEF, is a cytokine that is highly expressed in visceral fat and was originally isolated as a secreted factor that synergizes with IL-7 and stem cell factors to promote the growth of B cell precursors(**Jaswinder K and Vidal-Puig, 2005**).

However, the biological activity ofVisfastin is poorly understood it is secreted by activated lymphocytes, monocytes and neutrophils, it has been recently found that Visfatin expression in visceral fats is increased in obese subjects and that plasma concentrations ofVisfatin correlated much more strongly with amount of visceral fat than that of adipose tissue(**Fantuzzi, 2006**).

Visfatin exerts insulin mimetic effects that are dose dependent and quantitatively similar to those of insulin in stimulating muscle and adipocyte glucose transport and in inhibiting hepatocyte glucose production(**Fukuhara et al., 2005**), intravenous injection of recombinant visfatin in mice decreased plasma glucose in a dose dependent fashion, it was alsoas effective as insulin in reducing hyperglycemia in insulin deficient diabetic mic(**Boucher et al., 2005**).

Visfatin was also found to be bound to an active insulin receptor, causing receptor phosphorylation and the activation of downstream signaling molecules. however, visfatin and insulin

did not compete on binding to the insulin receptor indicating that Visfatin showed significant elevations in patients with type 2 diabetes mellitus and these elevations were present in patients taking hypoglycemic agents and in non-treated new patients, this might refers to the fact thatvisfatin elevations are not related to treatment(***Stephens and Vidal-Puig, 2006***).

Several features about visfatin suggest that this molecule might be important for understanding the biological differences between intra-abdominal (visceral) and sub-cutaneous adipose tissue, and their contribution to the metabolic syndrome. First, visfatin is detected in the plasma and its concentration correlates with intra-abdominal fat mass but not with subcutaneous fat mass. Furthermore, the fact that visfatin increases in plasma following a high-fat diet suggests that it has an important role in diet- or obesity-induced insulin resistance. The earlycharacterisation of visfatin suggested that it could be a secreted protein, in spite of not having the typical signal peptide that is common to other secreted proteins. Therefore, at first sight visfatin appears to be an excellent candidate for an adipokine that is preferentially secreted by the intra-abdominal adipose tissue and links the expansion of this adipose depot to insulin resistance(***Fukuhara et al., 2005***).

Although Fukuhara *et al.*, clearly suggested an endocrine role for visfatin, it cannot be excluded that visfatin might also

have a paracrine effect on the visceral adipose tissue, facilitating the differentiation of the adipose tissue through its pro-adipogenic and lipogenic actions. In fact, the overexpression of visfatin in a preadipocyte cell line facilitates its differentiation to mature adipocytes and promotes the accumulation of fat through the activation of glucose transport and lipogenesis (*Fukuhara et al., 2005*).

Precedence for paracrine action has previously also been proposed for PBEF action in foetal membranes(*Ognjanovic et al., 2002*).

A direct effect of visfatin on adipose tissue is further supported by its localization in the nucleus and cytoplasm, indicating a role in cell-cycle regulation (*Kitani et al., 2003*).

AIM OF THE WORK

The aim of this study is to study the level of serum visfatin in obese persons in male and female and to try to find different between both groups and also to try to correlate between visfatin and different type of obesity in male and female and different complications and risk factors.

OBESITY

Definition

Obesity is a complex disorder involving an excessive amount of body fat. Obesity isn't just a cosmetic concern. It increases the risk of diseases and health problems, such as heart disease, diabetes and high blood pressure.

Obesity is diagnosed when the body mass index (BMI) is 30 or higher. The body mass index is calculated by dividing the weight in kilograms (kg) by the height in meters (m) squared. For most people, BMI provides a reasonable estimate of body fat. However, BMI doesn't directly measure body fat, so some people, such as muscular athletes, may have a BMI in the obese category even though they don't have excess body fat (*Moyer et al., 2012*).

The World Health Organization (WHO), states that: Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.

Also, that: Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m^2).

The WHO definition for obesity is:

- A BMI greater than or equal to 25 is overweight.
- A BMI greater than or equal to 30 is obesity.

Furthermore, BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, **“it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals”(WHO, 2015).**

Some recent WHO global estimates show:

- In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese.
- Overall, about 13% of the world’s adult population (11% of men and 15% of women) were obese in 2014.
- In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight.
- The worldwide prevalence of obesity more than doubled between 1980 and 2014.

(WHO, 2015)

Symptoms

Difficulty of breathing (DOB), sleep disturbance, depression and mood disturbance are few of the complaints associated with overweight(*Moyer et al., 2012, Papadakis et al., 2014*).

Causes:

Although there are genetic, behavioral and hormonal influences on body weight, obesity can occur when a person takes in more calories than he or she can burn (metabolize) through exercise and normal daily activities. The body stores these excess calories as fat.

Obesity can sometimes be traced to a medical cause, such as Prader-Willi syndrome, Cushing's syndrome, and other diseases and conditions (*Cassidy SB, et al., 2011*), (*Steffensen, C et al., 2010*).

Many causative factors that may lead to overweightness and obesity.(**Bray GA. Accessed March 9, 2015.**)

However, many of these disorders are rare and, in general, the principal causes of obesity are:

- **Inactivity.** If a person is not very active, he won't burn as many calories. With a sedentary lifestyle, a person can easily

take in more calories every day than he can use through exercise and normal daily activities.

- **Unhealthy diet and eating habits.** Weight gain is inevitable if a person regularly eat more calories than can burn. And most modern diets are too high in calories and are full of fast food and high-calorie beverages.

(Després et al., 2008&WHO, 2000)

Risk factors

Obesity usually results from a combination of causes and contributing factors, including:

- **Genetics.** A person's genetic make-up may affect the amount of body fat store, and where that fat is distributed. Genetics may also play a role in how efficiently a body converts food into energy and how a body burns calories during exercise.*(Lindgren et al., 2009).*
- **Family lifestyle.** Obesity tends to run in families. If one or both of the parents are obese, the risk of being obese is increased. That's not just because of genetics. Family members tend to share similar eating and activity habits.
- **Inactivity.** If a person is not very active, and don't burn as many calories, with a sedentary lifestyle, he can easily take in

more calories every day than he can burn through exercise and routine daily activities. Having medical problems, such as arthritis, can lead to decreased activity, which contributes to weight gain.

- **Unhealthy diet.** A diet that's high in calories, lacking in fruits and vegetables, full of fast food, and laden with high-calorie beverages and oversized portions contributes to weight gain. See also (Portion Distortion.
- **Medical problems.** In some people, obesity can be traced to a medical cause, such as Prader-Willi syndrome, Cushing's syndrome and other conditions. Medical problems, such as arthritis, also can lead to decreased activity, which may result in weight gain.
- **Certain medications.** Some medications can lead to weight gain if there is no compensation through diet or activity. These medications include some antidepressants, anti-seizure medications, diabetes medications, antipsychotic medications, steroids and beta blockers.
- **Social and economic issues.** Research has linked social and economic factors to obesity. Avoiding obesity is difficult if you don't have safe areas to exercise. Similarly, you may not have been taught healthy ways of cooking, or you may not have money to buy healthier foods. In addition, the people a

personspends time with may influence his weight — “*you're more likely to become obese if you have obese friends or relatives*”(Bray, 2015).

- **Age.** Obesity can occur at any age, even in young children. But as a person age, hormonal changes and a less active lifestyle increases the risk of obesity. In addition, the amount of muscle in the body tends to decrease with age. This lower muscle mass leads to a decrease in metabolism. These changes also reduce calorie needs, and can make it harder to keep off excess weight. If a person doesn't consciously control what he eats and become more physically active as he age, he'll likely gain weight.
- **Pregnancy.** During pregnancy, a woman's weight necessarily increases. Some women find this weight difficult to lose after the baby is born. This weight gain may contribute to the development of obesity in women.
- **Quitting smoking.** Quitting smoking is often associated with weight gain. And for some, it can lead to enough weight gain that the person becomes obese. In the long run, however, quitting smoking is still a greater benefit to your health than continuing to smoke.
- **Lack of sleep.** Not getting enough sleep or getting too much sleep can cause changes in hormones that increase the

appetite. You may also crave foods high in calories and carbohydrates, which can contribute to weight gain.

“Even if a person has one or more of these risk factors, it doesn't mean that he's destined to become obese. You can counteract most risk factors through diet, physical activity and exercise, and behavior changes.”

Complications

Complications of Childhood Obesity.

An overweight or obese person is more likely to develop a number of potentially serious health problems, including:

- High triglycerides and low high-density lipoprotein (HDL) cholesterol (*Tchernof et al., 1996*).
- Type 2 diabetes mellitus (*Eckel et al., 2011, Chan et al., 1994, Lipton et al., 1993, Ford et al., 1997, Larsson et al., 1981*).
- Systemic Hypertension (*Dyer and Elliott, 1989*).
- Metabolic syndrome — a combination of high blood sugar, high blood pressure, high triglycerides and low HDL cholesterol. (*Després et al., 2008*).

- Coronary Heart Disease (*Hubert et al., 1983*).
- Cerebrovascular Stroke(*Rexrode et al., 1997*).
- Cancer, including cancer of the uterus, cervix, endometrium, ovaries, breast, colon, rectum, esophagus, liver, gallbladder, pancreas, kidney and prostate(*Chute et al., 1991; McGinnis & Foege, 1993*).
- Breathing disorders, including sleep apnea, a potentially serious sleep disorder in which breathing repeatedly stops and starts (*Young et al., 1993*).
- Gallbladder disease (*Stampfer et al., 1992*).
- Gynecological problems, such as infertility and irregular periods (*Bournat, 2010*).
- Erectile dysfunction and sexual health issues (*Bournat, 2010*).
- Nonalcoholic fatty liver disease (NAFLD). This could lead to inflammation or scarring, and possibly cirrhosis of the liver(*Björntorp, 1991&Després et al., 2008*).
- Osteoarthritis (*Hochberg et al., 1995*).
- Higher mortality from all causes(*Romero-Corral et al, 2006*).

Quality of Life

When you're obese, overall quality of life may be diminished. You may not be able to do things you used to do, such as participating in enjoyable activities. You may avoid public places. Obese people may even encounter discrimination.

Other weight-related issues that may affect the quality of life include:

- Depression
- Disability
- Sexual problems
- Shame and guilt
- Social isolation
- Lower work achievement

(Bray, 2015)

Tests and Diagnosis

If the patient's BMI is in the obese range, the health care provider should typically review the health history in detail, perform a physical exam and recommend some tests.

These exams and tests generally include:

- **Taking a health history.** The doctor should review the weight history, weight-loss efforts, exercise habits, eating patterns, what other conditions the patient had, medications, stress levels and other issues about his or her health. The doctor may also review the family's health history to see if the patient may be predisposed to certain conditions.
- **A general physical exam.** This includes also measuring the height; checking vital signs, such as heart rate, blood pressure and temperature; listening to the heart and lungs; and examining the abdomen.
- **Calculating the BMI.** The doctor will check the body mass index (BMI) to determine the level of obesity. This should be done at least once a year. The BMI also helps determine the overall health risk and what treatment may be appropriate.
- **Measuring the waist circumference.** Fat stored around the waist, sometimes called visceral fat or abdominal fat, may further increase the risk of diseases, such as diabetes and heart disease. Women with a waist measurement (circumference) of more than 35 inches (80 centimeters) and men with a waist measurement of more than 40 inches (102 cm) may have more health risks than do people with smaller