

# OBSERVATIONAL STUDY ON EFFICACY OF STEAM BATH ON WATER METABOLISM TO ENHANCE THE WEIGHT LOSS IN HEALTHY OBESE VOLUNTEERS IN BOTH MALES AND FEMALES.

**DR.R.ANUSHA<sup>1</sup>, DR.T.C.SUBHASHINI<sup>2</sup>, DR.C.M.DHIVYA<sup>3</sup>, DR.VIGNESHWARI MONISHA<sup>4</sup>.**

1. Professor, Department of Naturopathy, Sree Ramakrishna medical college of Naturopathy and yogic sciences and Hospital, Kulasekharam. (T.N.)India
2. Professor, Department of Naturopathy, Sree Ramakrishna medical college of Naturopathy and yogic sciences and Hospital, Kulasekharam. (T.N.)India
3. Professor, Department Hydrotherapy, Sree Ramakrishna medical college of Naturopathy and yogic sciences and Hospital, Kulasekharam. (T.N.)India
4. Lecturer, Department of Naturopathy, Sree Ramakrishna medical college of Naturopathy and yogic sciences and Hospital, Kulasekharam. (T.N.)India

## **ABSTRACT**

*Objective:* The aim of the study is to assess the effects of steam bath on weight loss and water metabolism. *Material & Methods:* Eight physically active obese subjects in the age group of 30-40 years were selected for the study at Sree Ramakrishna medical college of Naturopathy and yogic sciences, Kulasekharam. Two males and Six females were subjected to eight steam baths on alternate days. The temperature was maintained at 50<sup>0</sup>C. The duration was 15 minutes for each sauna bath. The weight, waist circumference, Arm circumference, Thigh circumference were estimated before and after seven steam baths.

*Results:* The weight, waist circumference, Arm circumference, Thigh circumference were significantly decreased was significantly increased after seven steam baths. There was significant reduction in weight after seven steam baths.

*Keywords:* Water Metabolism, weight loss, steam bath.

## **INTRODUCTION**

Overweight and obesity, serious and growing. Problems obesity is a complex, multi functional disease that develops from the interaction between genotype and the environment. It involves the integration of social, behavioral, cultural, physiological, metabolic and genetic factors.

As obesity is increasing risk of multiple systemic disorders it has to be taken as a serious alarming disease in this modern era.

Obesity is the most prevalent nutritional disorder in prosperous communities in the result of an energy balance lead to an increase store of energy mainly adipose tissues. Obesity arises only as consequences of taking in more energy in their food than is expended in the activities of their daily life.

**TYPES**

1. Central obesity, also called as abdominal, visceral, Android or apple shaped obesity, is due to intra – abdominal fat.
2. Generalized obesity, also called gynoid or pear-shaped obesity is due to subcutaneous fat.
3. Abdominal obesity  
Waist hip ratio : Men more than 1.0 and women more than 0.8  
When compared to pear shape, persons with abdominal obesity are at risk of developing insulin resistance, diabetes, hypertension, hyperlipidemia, as well as hyperandrogenism in women.

**IDENTIFICATION**

1. Body mass index (BMI) or Quetelet's index = Weight (kg)/Height (m<sup>2</sup>)
2. Skin fold thickness – To evaluate nutritional status by estimating the amount of subcutaneous fat at specific areas (upper arm or triceps, subscapular region and upper abdomen)
3. Brocca Index = Height (cm) – 100. It is used to measure ideal body weight using only height.

**PATHOGENESIS**

Causes of obesity include psychological factors, metabolic and endocrine factors, genetic factors and environmental factors. Faculty eating habits, fast food consumption, use of trans-fats have been also considered as major challenges in obesity outbursts. Earlier, the National Institute for Nutrition, which comes under the Indian Council for Medical Research, had found high high prevalence of obesity in adults in a 2016 study -44% of women were obese and 11% underweight in urban India. As income rise, more sedentary jobs and diets high in Carbohydrates, edible oils, sweeteners and animal source foods increase and research has linked these to NCDs. An increased consumption of high calorie foods, without an equal increase in physical activity leads to an increase in weight. Decreased levels of physical activity will also result in an energy imbalance and lead to weight gain.

The lipid storing cells, adipocytes comprise the adipose tissue, and are present in vascular and stromal compartment in the body. Besides the generally acknowledged role of adipocytes for fat storage capacity. These cells also release endocrine regulating molecules. These molecules include energy regulatory hormone (leptin), cytokines (TNF -  $\alpha$  and interleukin -6), insulin sensitivity regulating agents (adiponectin, resistin and RBP4), prothrombotic factors (plasminogen activator inhibitor) and blood pressure regulating agent (angiotensinogen).

Adipose mass is increased due to enlargement of adipose cells due to intracellular lipid deposition as well as due to increase in the number of adipocytes. The most important environmental factors excess consumption of nutrients which can lead to obesity.

In any case, fundamental atomic components of corpulence are starting to unfold based on perception that weight is recognizable and is seen in indistinguishable twins. As of late, two weight qualities have been found.

**IMPORTANCE OF BMI AND WAIST CIRCUMFERENCE**

The body mass index and Waist circumference are objective measures that are normally used to detect and classify the state and level of obesity.

BMI - The BMI has been recognized worldwide as an effective method of quantifying obesity by the WHO, The national institute of health and the center's for diseases control prevention, USA.

It is derived from a formula that uses the weight and height to estimate body fat and health risks.

BMI = weight in kilograms/ height in meter

Typical extend of the BMI is between 18.5 and 24.9 units. Those between 25 and 29.9 are considered overweight and if it is 30 or greater the person is considered to be obese. BMI above is considered to be extremely or morbidly obese and usually requires surgical intervention.

**WAIST CIRCUMFERENCE**

Guidelines from National heart, lung, and blood institute, USA suggest that in addition to BMI measurements, WC should also be assessed. The rules indicate the nearness of overabundance fat within the abdomen that’s out of extent to an individual add up to body fat is an autonomous indicator of risk factors and morbidity.

WC is measured at the mid-point between the lower border of the rib cage and the illac crest. Men and Women with a WC of more than 94cm and 80 cm respectively are at an increased risk whereas they are at a substantial increase risk when the WC goes beyond 100 cm and 90 cm respectively.

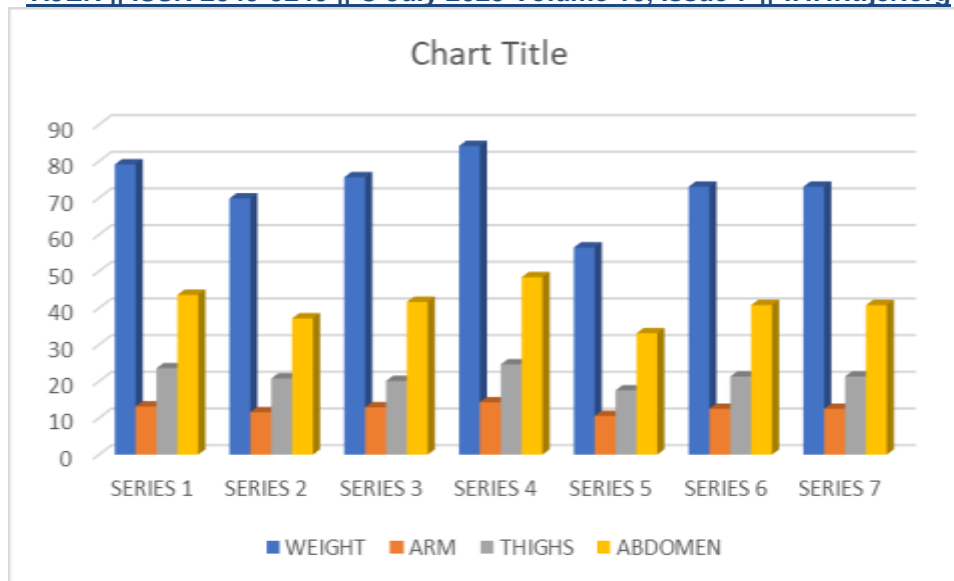
**PROCEDURE**

8 overweight and sedentary men and women aged 30±2.8 y was exposed to six steam sessions of 10 minutes each (temperature: 90-91°C; relative humidity: 13-18 %) with four 3-4 minute cool-down breaks. Body composition was determined before steam, and body mass and blood pressure were measured before and after steam. Physiological parameters were monitored during four 10-minute steam sessions.

The patients were asked to drink 1 or 2 glasses of water and take a cold shower before entering the steam room. Allow the patient to sit inside the steam cabin with head projecting out and enveloped all round with a blanket. Immediately after the steam bath a quick shower was taken, this will be act as a refresher. The patient should then, relapse for 30 to 45 mins. Sometimes during the bath, one may feel giddy or uneasy. In such cases they should immediately be taken out and cold water given to drink until the unpleasant symptoms disappear.

t-Test: Paired Two Sample for Means

	<i>Variable</i> <i>1</i>	<i>Variable</i> <i>2</i>
Mean	76.325	73.775
Variance	101.4164	100.0279
Observations	8	8
Pearson Correlation	0.996052	
Hypothesized Mean Difference	0	
df	7	
t Stat	8.063808	
P(T<=t) one-tail	0.00430%	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.0087%	
t Critical two-tail	2.364624	



## **RESULT**

This was statistically significant improvement in parameters like weight, BMI, waist circumference and arm circumference.

## **DISCUSSION**

Exposure to high temperature, Steam bath is a stimulating and blood derivative treatment. It's promoting skin and tissue circulation and elimination of toxins for obese people.

Increase perspiration. Steam dilates the blood vessels and improves blood circulation to the skin and subcutaneous fat deposits. It activates and opens sweat pores and eliminates toxins through sweat. It increases the body metabolism and helps to utilize extra calories and helps to control further fat deposits in the body.

The composition sweat varies with the rate of sweating. Its chemical composition is similar to plasma infiltrate. Its sodium concentration is approximately 140mg/L. It contains other plasma constituents such as K<sup>+</sup>, Cl<sup>-</sup>, Ca<sup>++</sup>, urea, ammonia, creatinine, uric acid, lactic acid etc. Amount of sweat normal is about 100 ml/day, but during heavy exercise and due to exposure to heat / hot to environment. When the body is exposed to steam, body temperature rises. Skin warmth the receptors and body convey these changes to the hypothalamic thermostats. The thermostat inhibits the adrenergic activity of the sympathetic Nervous system which controls vasoconstriction and metabolic rate, this causing cutaneous vaso dilatation and reducing BMR. This causes an increase in heat loss via skin and a decrease in heat production in the core.

If the heat sufficiently increases, the cholinergic sympathetic fibers, which innervate sweat glands release Acetylcholine, stimulating sweat, sweating is the most effective involuntary heat fighting response in man. Sweat moreover known as sweating is the generation of liquids emitted by the sweat glands within the skin of warm-blooded creatures. As body's internal temperature start rising, the hypothalamus tells Eccrine sweat glands distributes all over our body that it's time to start cooling down by producing sweat. This sweat has to evaporate of our skin for this process to actually work. That's because cooling our body via sweating release on a principle of physics called heat of vaporization. The anxious framework consequently triggers sweat organs when our body temperature rises hence sweating happens. Sweat is mainly H<sub>2</sub>O but it also contains some salts. Its primary work is to control body temperature. As h<sub>2</sub>O is the sweat evaporate, the surface of skin cools. Reducing body H<sub>2</sub>O, body mass and plasma volume. This loss of H<sub>2</sub>O correspondence to reduction of body mass also steam bath favors increase sweating that leads to smaller (minute) body loss (inches).

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