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## Effect of Obesity on Semen Volume and Sperm Counts of Sri Lankan Male

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### ABSTRACT

A cross sectional study was carried out in Gampaha Wickramarachchi Ayurveda Hospital during the period of August 2014 to August 2015 to find out the effect of male obesity on the volume and sperm count of semen. Male obesity as well as male infertility has become serious social issues in modern society. The relationship between the two is controversial. The number of local studies is lesser compare to foreign studies on the matter. Thus the current study was set up to overcome the gap. Every Sri Lankan healthy male (average age 30) who visited the clinic for fertility issues was personally evaluated on consent to gather the anthropometric (weight and height) and demographic data. The semen of each was also collected (after 3 days absent from ejaculation) and analyzed separately. BMI values were also calculated. Out of 80 subjects, 40 were normal in BMI values (18-24.9) and 12 were obese (>30). The others were moderately obese (25-29.5). However while comparing, average volumes and sperm counts of normal and obese groups, it was found that there was no true significant relationship of semen volume and sperm count with male obesity.

**KEYWORDS:** Estrogen, Male obesity, Sperm Count, Semen Volume,

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## **1 Introduction**

Declining of birth rate has become a serious social issue in under developed countries including Sri Lanka. It has been discovered that the responsibility of male party for declining birth rate is around 40% (Abarikwu 2013) which is considerable. The male infertility could be due to various reasons. Though clinicians mainly pay their attention on genetic, pathological and anatomical factors with regard to male infertility, the effect of unfavorable biological as well as biochemical factors which are liable to cause male infertility is attended poorly. Thus this study was set up to evaluate and highlight the effect of latter factors on male infertility. It's expected that the study will provide an insight for local scientists to harness and harvest more and more knowledge in the field. Male infertility is determined mainly by semen quality which is correlates with main semen parameters such as volume, sperm count, sperm morphology and motility. Under the study it was aimed to analyze the effect of obesity on semen volume and sperm count.

### **1.1 Research Problem**

The male infertility rises day to day due to various causes. However infertility is a serious condition for personal as well as for social issues. Most of the infertility cases are reversible. But the etiological studies on such cases are lacking. Thus the study was set up to assess the effect of obesity which is one such on certain important semen parameters of male.

### **1.2 Objective**

To investigate whether semen volume and count depend on male obesity.

### **1.3 Hypothesis**

Semen volume as well as count depends directly on male obesity.

### **1.4 Criteria**

#### **1.4.1 Inclusive criteria**

Healthy adult males (age over 18)

#### **1.4.2 Exclusive criteria**

Individuals suffering from diseases such as diabetes, hypertension and cancer.

Individuals with anatomical defectives in reproductive system

Individuals obtaining medicines such as, steroids, hormones, anti-gastric treatment (cimetidine)

### **1.5 Literature**

A group of researchers (Argentina - 2012) evaluated semen samples of obese men (n = 749) and found out that 155 of them had fewer motile sperm. Further they found that obese men had also generally lower levels of neutral alpha-glucosidase, an enzyme which assists the function of epididymis (Norton 2010).

Dr. Michael Eisenberg and his colleagues (USA-2013) measured BMI and waist circumference of 468 men who visited fertility clinic due to various problems and found out that higher than normal BMI and waist circumference values correlate with subnormal ejaculate volume but not with poor sperm quality (NBC news 2014).

A study launched with 943 men (average age = 30 year) in 2008 revealed that increase of weight has a linear decline of certain sperm qualities such as sperm count, motility (Jesitus 2008).

## **1.6 Methods and Methodology**

The male partners of infertile couples who visited fertility clinic of Gampaha Wickramarachchi Ayurveda Institute during the period of 2014 - 2015 were made involve in the study. Each and every individual were isolated and explained about the study and were given equal time to ask questions in order to have a clear idea about the study. Ones who wished to participate in the study were screened for the exclusive criteria and the selected individuals were considered as the study group in the research.

Thus the selected group was explained further the objectives of study and were given a convenient appointment to participate in the study. Further the individuals were acknowledged to refrain from ejaculation, smoking and consumption of alcohol since 03 days before the collection of semen.

During the particular day, the written consent was obtained from the individual separately. Thereafter the participants were interviewed and measured by the main investigator personally in a secret manner to gather the required data.

### **1.6.1 Measuring Height** (Elamine 2013)

Materials required – square flat, measuring tape.

The subject was asked to remove shoes, cap and hats etc.

He was instructed to stand erect as possible on the flat floor with his back and feet against the wall fixed with measuring tape. Then the height was obtained.

### **1.6.2 Measuring Weight** (Elamine 2013)

Material required – scale.

The calibrated scale was checked again whether it was balance on condition and zero in value for the accuracy.

Thereafter the subject was asked to be freeing as much as possible from artificial weight such as unnecessary garments, hat, watch slippers, shoes, wallets, keys etc.

Then he was asked to stand on the scale facing toward meter reading of scale while keeping both feet on the center of the platform freely.

Finally the subject was asked to be relaxed and look ahead. Thus the weight was recorded to the nearest 100g

For the accuracy the measurement was obtained twice. BMI was calculated with the equation

$$\text{BMI} = \frac{\text{weight (Kg)}}{\text{Height}^2 \text{ (m)}}$$

### 1.6.3 Semen analysis (Heuck and Moody 2003)

#### Materials and reagents

Microscope  
Microscopic slides  
Cover slips  
Blood (Sahli) pipettes  
Measuring cylinder (10ml)  
Improved Neubauer counting chamber  
Sodium bicarbonate  
Phenol/formalin  
Distilled water

The semen diluting fluid was prepared by mixing 1 ml of phenol and 5 g of sodium bicarbonate in 100 ml of volumetric flask and diluting the mixture up to 100 ml with distilled water.

After liquefaction was taken place, the volume of semen was measured with 10 ml of measuring cylinder. Then the semen mixture was gently shaken to mix the specimen and using Sahli pipette semen was drawn up to 0.5 micro liter mark.

Then the prepared semen diluting fluid was place up to 11 micro liter mark and placed the pipette on a rotator to mix the interior contents well.

Thereafter, the Improved Neubauer counting chamber was loaded with the mixture and allowed the sperm to settle in it. Eventually, the number of sperms in four corner squares was counted.

$$\text{Number of sperm/ml} = \frac{n \times 10 \times 20 \times 1000}{4}$$

n = number of sperm counted in four corner squares.

Finally according to the BMI ranges, individuals were categorized as normal, moderate and obese and average values of two semen parameters (volume and count) were obtained for the individuals in normal and obese groups.

Eventually the average values of variable in each control and test group ware analyzed with Wilcoxon sign ranked test of SPSS software.

## 1.7 Results and analysis

Total number of individuals = 80

Table 1- The number of individual in particular BMI range

BMI range	Number of individuals found in the range (N =80)
18-24.9 (normal)	40
25-29.9 (tend to be obese)	27
30 and over 30 (obese)	13

Table 2 - The average semen volume and semen count in each normal (control) and obese group (test)

	Control (n=40)	Test/obese (n=12)	P value
Average semen volume	2.10±1.30 ml	2.20±1.10 ml	0.36
Average sperm count	68 x 10 <sup>6</sup> ± 44.90 sperms/ml	54 x 10 <sup>6</sup> ±42.10 sperms /ml	0.04

## 1.8 Discussion and Conclusion

According to the result it was clear that the average volumes of semen of both groups were within the normal reference limit (over 2ml). Further the difference between them was less such as 0.1 ml and was nearly similar to each other. Moreover the P value of the difference was also 0.36 which indicating further that the particular difference was insignificant even statically. Thus it was clear that the semen volume was independent of obesity.

When considering the result of average semen count, even though a statistically significant P value (p=0.04, P<0.05) was seen, it was not a true significant value due to the reason of being both values in the normal reference range for sperm count. Thus it could be conclude that both semen volume and count were independent of obesity. However thou theoretically it was prominent that the higher estrogen level which was common in obese had a less favor on sperm production, according the present study it was made false.

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