|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
*Index Copernicus Value 2019: 79.34*
Original Research Article
Volume 4, Issue 10; October: 2020; Page No. 35-37

# TO CORRELATE BETWEEN BIOCHEMICAL PARAMETERS AND DIFFERENT GRADES OF OBESITY

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**Article Info:** Received 11 September 2020; Accepted 14 October 2020
**DOI:** https://doi.org/10.32553/ijmbs.v4i10.1464
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**Conflict of interest:** No conflict of interest.

**Abstract**
Background & Method: In this case control (observational) study we include 114 participant (n=57 cases and n=57 controls) in this case and controls taken using standard sampling procedure participants are taken who attend Medicine OPD in Netaji Subhash Chandra Bose Medical college Jabalpur in period of March 2015 to August 2016.
Result: We didn't found significant difference in cases on the basis of BMI and FBS,PPBS and GTT.We found correlation in cases on the basis of BMI and in Lipid Profile and we found there is significant difference in low density lipid level in overweight and moderate obese (t>2.08) and Triglyceride level and Serum cholesterol/HDL ratio in overweight and sever obese (t>1.97, t>2.41) and moderate and severe Obese (t>2.14, t>2.10).
Conclusion: In cases on the basis of Diastolic dysfunction and Lipid Profile we found significant difference between serum cholesterol/HDL levels in those who had Diastolic dysfunction compare to who don't have Diastolic dysfunction. Diastolic dysfunction appears not to be influenced by sex. The association between diastolic dysfunction and obesity according to sex is not significant. In cases on the basis of BMI and FBS, PPBS and GTT we don't found significant difference in cases. In grades of Diastolic Dysfunction and Lipid profile and we doesn't found any significant difference in grade 1 and grade 2 diastolic dysfunction on the basis of lipid profile.
Keywords: BMI, Left Ventricular, Transthoracic & Echocardiography.
**Study Designed:** Observational Study

## Introduction

Obesity and overweight as defined by WHO is abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight for height that is commonly used to classify overweight and obesity in adults.

The basis of BMI was devised by "adolpe quetelet" from 1830 to 1850 during which time he developed what he called social physics[(1)]. The modern term "body mass index" (BMI) for the ratio of human body weight to squared height was coined in paper published in the July 1972 edition of the "journal of chronic diseases" by "Ancel keys".

Obesity is associated with other comorbidities such as cardio vascular disease, type 2 diabetes, hypertension, certain cancers(pancreas, colon, and oesophagus), and sleep apnoea. In fact, obesity is an independent risk factor for cardiovascular disease[(2,3)]. Obesity is associated with an increased risk of mortality and morbidity and is associated with reduced life expectancy. It has been recognized that an extensive capillary network surrounds adipose tissue[(4)]. Adipocytes are located close to vessels with the highest permeability, the lowest hydrostatic pressure, and the shortest distance for transport of molecules to and from the adipocytes[(5)]. Resting blood flow is 2 to 3 ml/min per 100 g of adipose tissue and can increase up to10-fold.Adipose tissue blood flow increases after meal intake, but this modulation varies and may be decreased in patients with the features of the obesity-related metabolic syndrome[(6)].

## Material & Method

In this case control (observational) study we include 114 participant (n=57 cases and n=57 controls) in this case and controls taken using standard sampling procedure participants are taken who attend Medicine OPD in Netaji Subhash Chandra Bose Medical college Jabalpur in period of March 2015 to August 2016.

**Criteria for selection of patients:-**

**Inclusion criteria:**

- Normotensive patients,
- BMI> 25kg/m2(obese),
- BMI 23-24.9 kg/m2 (overweight),
- BMI 18.5 - 22.9 kg/m2 (average/healthy individuals),
- Both gender, patient who give inform consents.

**Exclusion criteria:-**

- Hypertension >140 - 90 mmhg,
- Diabetes mellitus type II,
- Age less than 14 and more than 40 year
- Congestive heart failure,
- Valvular heart disease,
- Prosthetic,
- Heart valves,
- Thyroid dysfunction,
- Constructive and restrictive heart diseases,
- Connective tissue disorder.

Echocardiogram is an important and simple tool to assess the ventricular function and underlying structural abnormality. Assessment of left ventricular systolic function in biplane Simpson's method is routinely used in clinical practice. It is a valuable tool in measuring left ventricular volumes and assessment of regurgitation. Echocardiography plays a vital role in the diagnosis of patients with heart failure, in part because the physical examination, electrocardiogram, and chest radiograph do not provide information that distinguishes diastolic from systolic heart failure. Trans mitral and pulmonary flow velocities are utilized in the assessment of diastolic dysfunction. Variation in the pattern of these velocities give insight into left ventricular diastolic function and prognosis.

1. Transthoracic Doppler echocardiography examination was performed in the supine and left lateral decubitus position.

2. Complete Echocardiographic examination done and traditional parameters of diastolic function were measured at the mitral leaflet tips over three consecutive cardiac cycles and included peak mitral e and a (early and late diastolic peak filling velocities) waves, e/a ratio, and mitral E wave DT.

3. Systolic dysfunction was defined by evidence of regional wall motion abnormalities and/or an ejection fraction of <55%.

**Results**

**Table 1:** Biochemical Parameters

| Biochemical Parameters | Case (57) | | Control (57) | |
|---|---|---|---|---|
| | Mean | ± sd | Mean | ± sd |
| Sch | 175.12 | 37.00 | 156.91 | 32.37 |
| HDL | 44.77 | 39.11 | 38.85 | 8.25 |
| LDL | 100.76 | 22.95 | 94.92 | 24.79 |
| TG | 114.25 | 63.62 | 108.63 | 45.84 |
| VLDL | 27.48 | 17.89 | 24.25 | 8.58 |
| Sch/HDL | 4.59 | 1.36 | 4.27 | 0.71 |
| GTT | 118.84 | 9.12 | 111.84 | 12.24 |
| FBS | 86.79 | 13.64 | 76.42 | 10.96 |
| PPBS | 116.12 | 12.69 | 109.33 | 14.88 |

**Table 2:** Correlation between lipid profile & BMI

| lipid profile | 23.0-24.9 (n=9) | 25-30 (n=31) | 30+ (n=17) | t-1/2 | t-1/3 | t-2/3 |
|---|---|---|---|---|---|---|
| S.CH | 160.50 (±25.04) | 172.71 (±26.73) | 188.93 (±54.29) | 1.32 | 1.81 | 1.13 |
| HDL | 39.36 (±6.93) | 50.29 (±52.20) | 37.47 (±9.66) | 1.14 | 0.58 | 1.32 |
| LDL | 91.20 (±15.27) | 104.50 (±23.30) | 99.50 (±25.47) | 2.08 | 1.04 | 0.66 |
| TG | 99.20 (±41.62) | 99.75 (±41.16) | 151.75 (±92.72) | 0.04 | 1.97 | 2.14 |
| VLDL | 24.24 (±6.18) | 26.48 (±20.16) | 31.44 (±18.25) | 0.55 | 1.45 | 0.85 |
| S.CH / HDL | 4.12 (±0.57) | 4.31 (±0.90) | 5.42 (±2.01) | 0.75 | 2.41 | 2.10 |

**t >1.96 = p <0.05**

We also found correlation in cases on the basis of BMI and in Lipid Profile and we found there is significant difference in low density lipid level in overweight and moderate obese (t>2.08) and Triglyceride level and Serum cholesterol/HDL ratio in overweight and sever obese (t>1.97, t>2.41) and moderate and severe Obese (t>2.14, t>2.10).

**Table 3:** Correlation in BMI and GTT, FBS and PPBS (Case)

| | 23.0-24.9 (n =9) | 25 – 30 (n = 31) | 30+ (n = 17) | t-1/2 | t-1/3 | t-2/3 |
|---|---|---|---|---|---|---|
| FBS | 88.70 (±12.39) | 84.94 (±14.12) | 89.19 (±13.71) | 0.81 | 0.09 | 1.00 |
| PPBS | 118.80 (±6.647) | 114.48 (±12.74) | 117.63 (±15.39) | 1.39 | 0.27 | 0.70 |
| GTT | 117.90 (±11.68) | 118.97 (±8.130) | 119.19 (±9.79) | 0.27 | 0.29 | 0.08 |

**t >1.96 = p <0.05**

In this table we compare in cases on the basis of BMI and FBS,PPBS and GTT we don't found significant difference in cases.

**Table 4:** Correlation between Grades of Diastolic dysfunction & Lipid Profile

| Grades | Grade 1 (N=12) | Grade 2 (N=2) | t-1/2 |
|---|---|---|---|
| S.CH | 202.72 (±51.39) | 174.00 (±12.72) | 1.60 |
| HDL | 37.43 (±12.88 | 32.25 (±15.20) | 0.45 |
| LDL | 116.36 (±30.79) | 107.50 (±0.70) | 0.95 |
| TG | 128.27 (±114.60) | 126.50 (±47.37) | 0.04 |
| VLDL | 29.62 (±24.38) | 29.50 (±3.53) | 0.02 |
| S.CH / HDL | 5.80 (±2.14) | 5.95 (±2.43) | 0.08 |

**t >1.96 = p <0.05**(non-significant)

**Discussion**

Correlate between cases and controls on the basis of fasting lipid profile and fasting and post prandial sugar

level and glucose tolerance test we found significant difference in serum cholesterol (t>2.797), serum cholesterol/HDL ratio (t>1.97), FBS (t>4.472), PPBS (t>2.62), GTT (t>3.46) level of cases and controls. Similar results are found in Smita P. Patil[7] et al (2012) also found significant relation in BMI and sugar level. Irrespective of our study Lior Shamai[8] et al (2010) Higher BMI was inversely associated with HDL and directly associated with TG. BMI showed no significant association with LDL, reason of mismatch of result is they doesn't exclude diabetic and hypertensive patients and their age limit is higher compare to our study.

Similar result is found in BMC Family Practice (2002) that overweight and obese adolescents have higher fasting plasma glucose and an abnormal lipid profile relative to their lean individuals.

We correlate in cases on the basis of BMI and in Lipid Profile and we found there is significant difference in low density lipid level in overweight and moderate obese (t>2.08) and Triglyceride level and Serum cholesterol/HDL ratio in overweight and sever obese (t>1.97, t>2.41) and moderate and severe Obese (t>2.14, t>2.10). More or less similar results are found in study done by Pallavi S. Kanthe[9] et al they conclude that values of TC, TG and VLDL showed significant increase in group II, III, IV compared to control. HDL, LDL and VLDL levels were seen significantly decreased in group I compared to control reason of mismatch of result is they use age group of 40-55 years and study done only on female genders. On the basis of BMI and FBS, PPBS and GTT we don't found significant difference in cases groups divide on the basis of body mass index.

Correlate between grades of Diastolic Dysfunction and Lipid profile and we doesn't found any significant difference in grade 1 and grade 2 diastolic dysfunction on the basis of lipid profile.

**Conclusion**

In cases on the basis of Diastolic dysfunction and Lipid Profile we found significant difference between serum cholesterol/HDL levels in those who had Diastolic dysfunction compare to who don't have Diastolic dysfunction.

Diastolic dysfunction appears not to be influenced by sex. The association between diastolic dysfunction and obesity according to sex is not significant. In cases on the basis of BMI and FBS, PPBS and GTT we don't found significant difference in cases.

In grades of Diastolic Dysfunction and Lipid profile and we doesn't found any significant difference in grade 1 and grade 2 diastolic dysfunction on the basis of lipid profile.

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