

UNRAVELING THE MECHANISM: OXIDATIVE STRESS'S INTRICATE ROLE IN OBESITY, DIABETES, AND CARDIOVASCULAR AILMENTS

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INTRODUCTION

obesity, a condition marked by dysregulated adipose tissue metabolism and chronic low-grade inflammation, oxidative stress acts as a pivotal mediator. By delving into the intricate molecular mechanisms governing ROS production, cellular responses, and oxidative damage, this investigation seeks to unravel the contributory role of oxidative stress in adipogenesis, insulin resistance, and the perpetuation of pro-inflammatory states within the obese milieu.

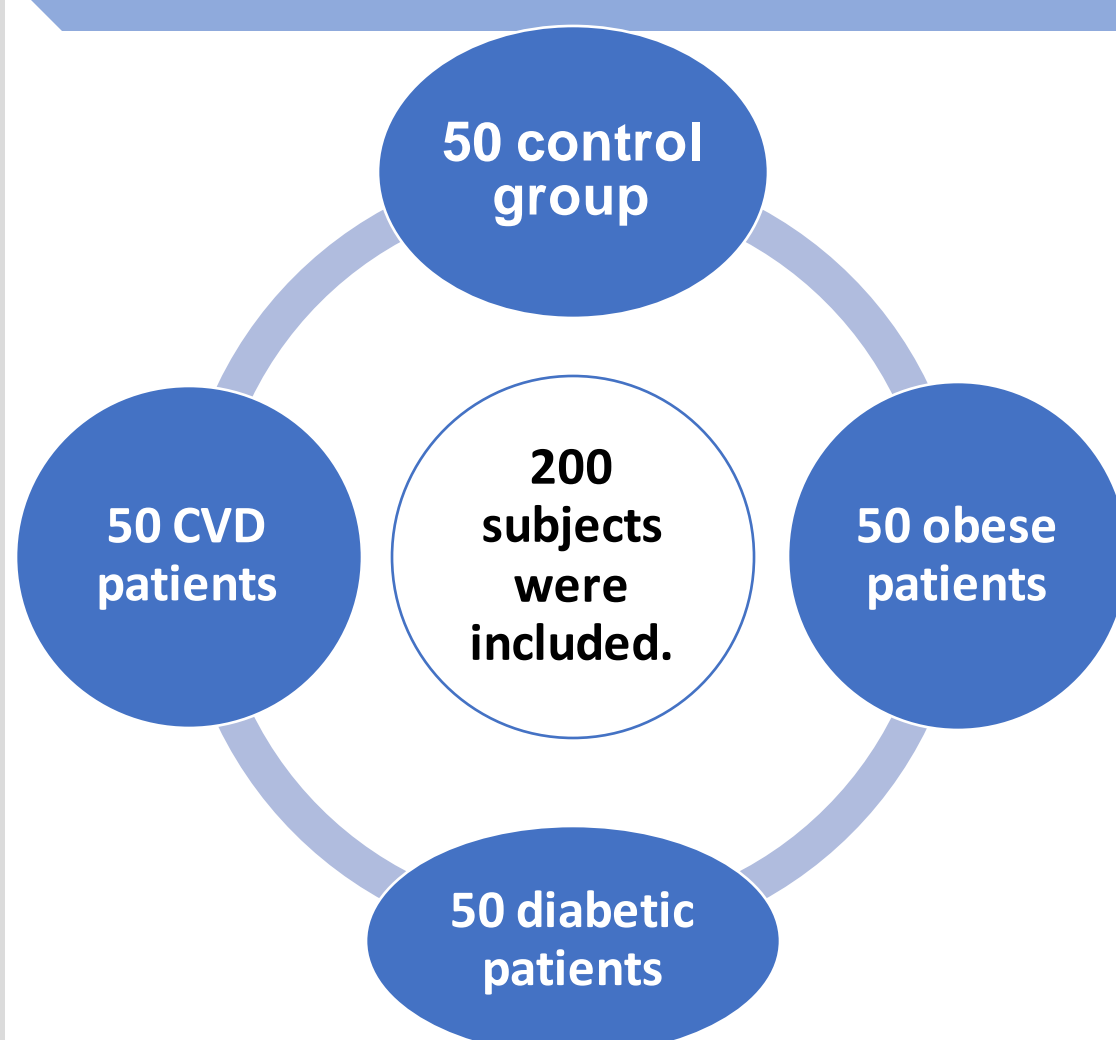
The intricate relationship between oxidative stress and diabetes further underscores the multifaceted nature of this redox imbalance. With a focus on the disruption of insulin signaling pathways, beta-cell dysfunction, and the resultant dysregulation of glucose homeostasis, this inquiry endeavors to elucidate the intricate molecular landscape linking oxidative stress to the etiology and progression of diabetes. Insights derived from this exploration hold promise for refining therapeutic modalities and preventive strategies in the management of diabetes.

In the realm of cardiovascular ailments, oxidative stress transcends its traditional association with cellular damage, emerging as a key player in the initiation and progression of atherosclerosis, endothelial dysfunction, and myocardial impairment. This investigation systematically dissects the redox-sensitive elements implicated in vascular pathophysiology, exploring the mechanistic links between oxidative stress and cardiovascular disorders.

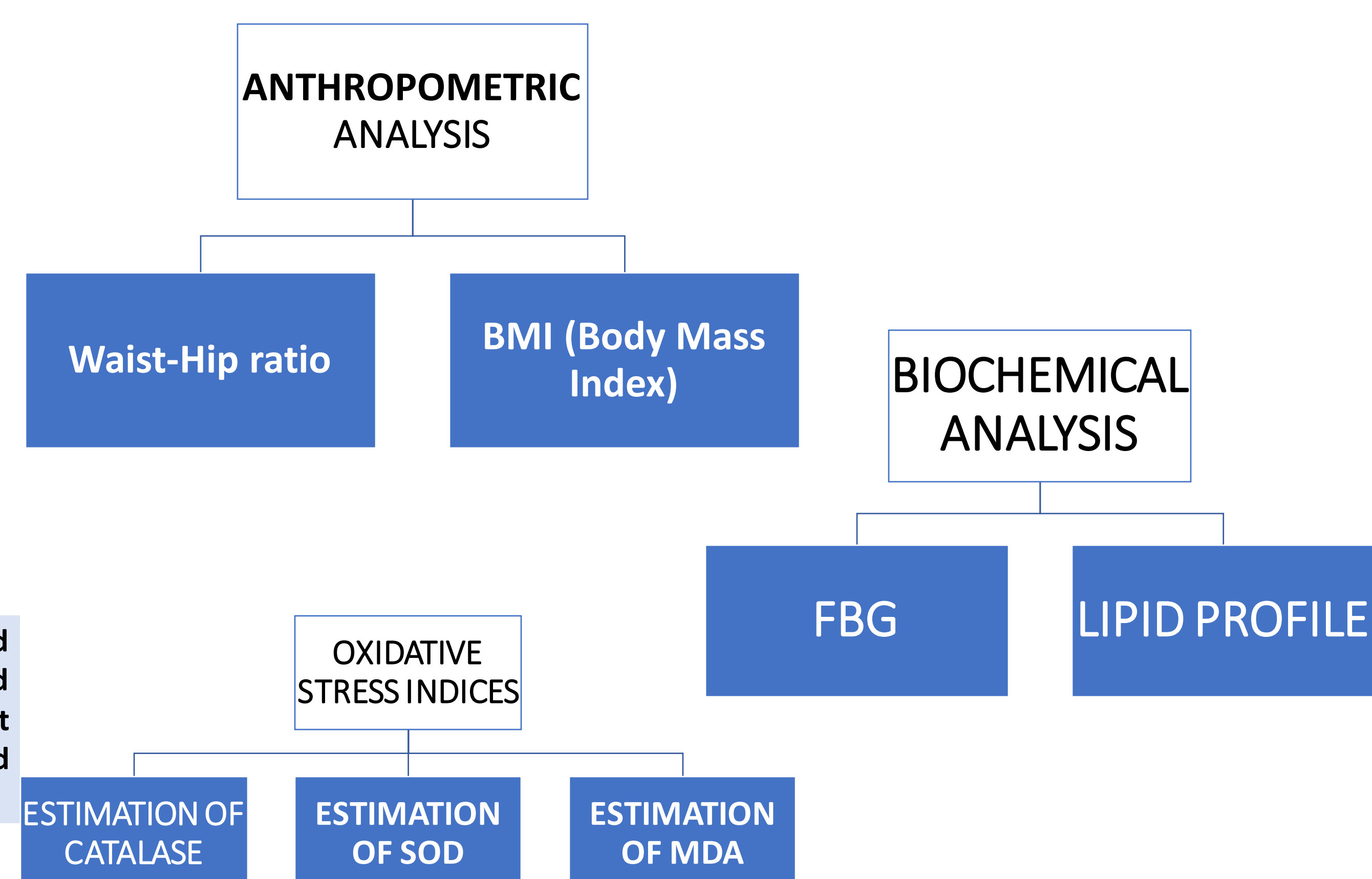
OBJECTIVES

Oxidative stress, characterized by an imbalance between reactive oxygen species (ROS) and endogenous antioxidant defenses, has emerged as a focal point in elucidating the intricate molecular underpinnings of obesity, diabetes, and cardiovascular ailments. This scientific exploration aims to dissect the nuanced interplay between oxidative stress and the pathogenesis of these prevalent health disorders, offering insights into the complex signaling cascades, redox-sensitive molecular targets, and systemic repercussions that underscore this intricate relationship.

METHODOLOGY



The blood samples from both control and patients were collected. Tubes were subjected to centrifuge at 3000 rpm for 10 minutes at 4°C to separate Serum and stored in Eppendorf for biochemical analysis



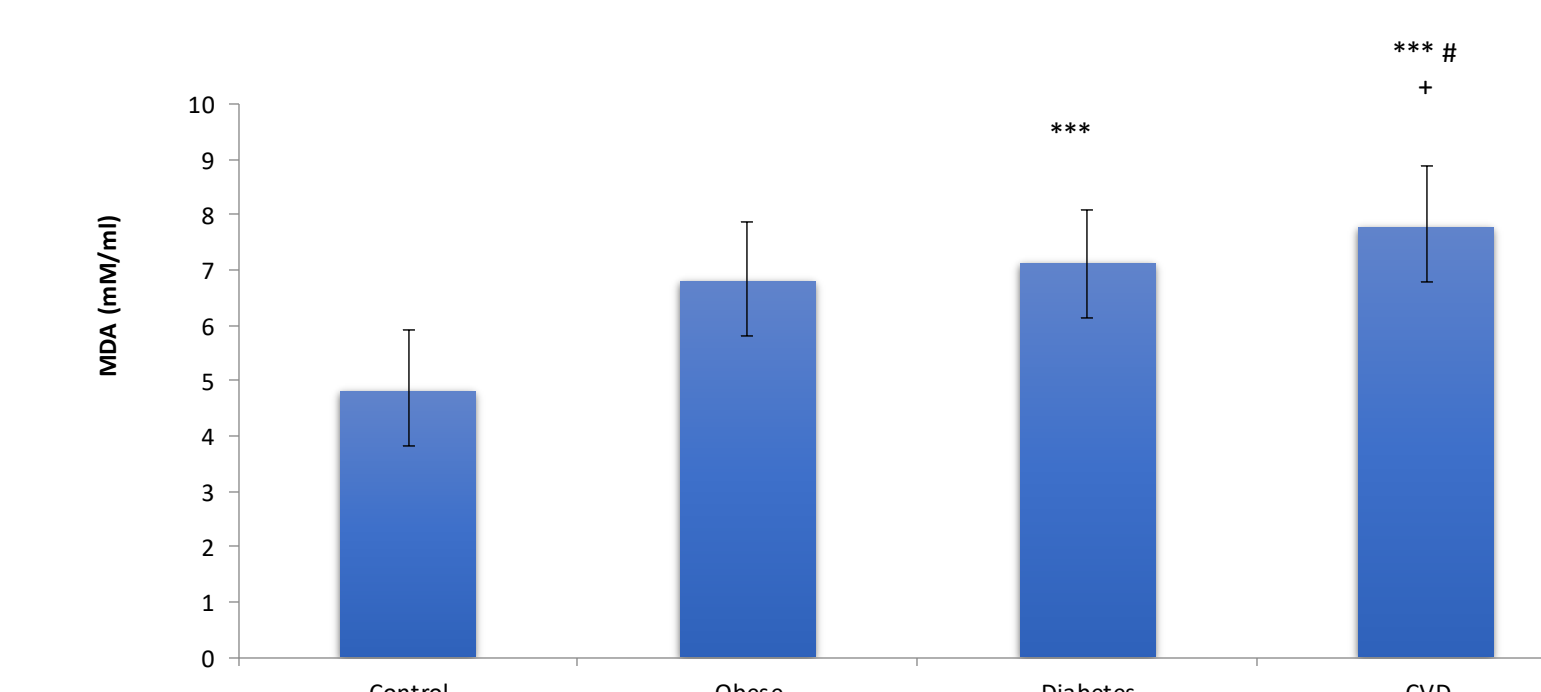
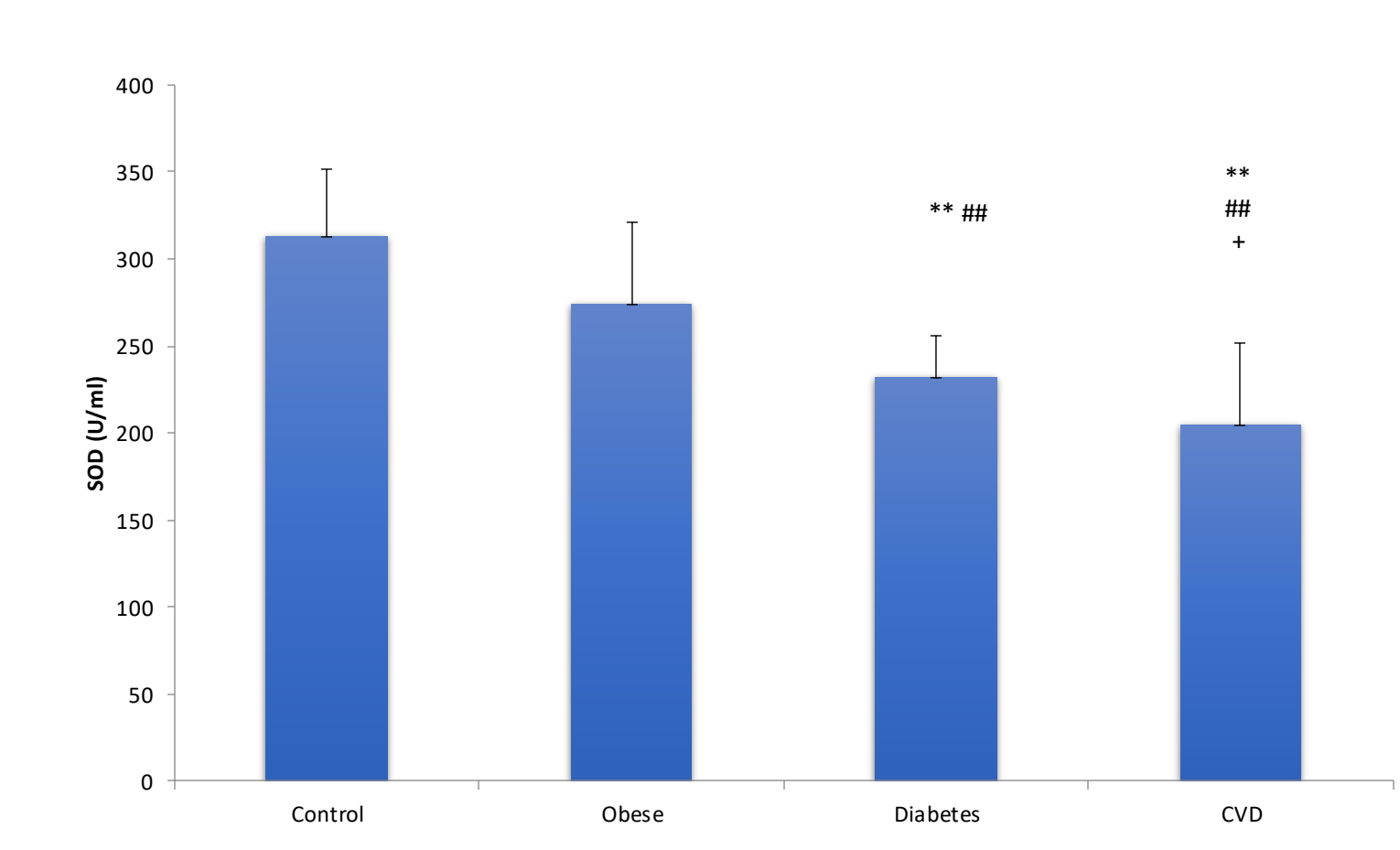
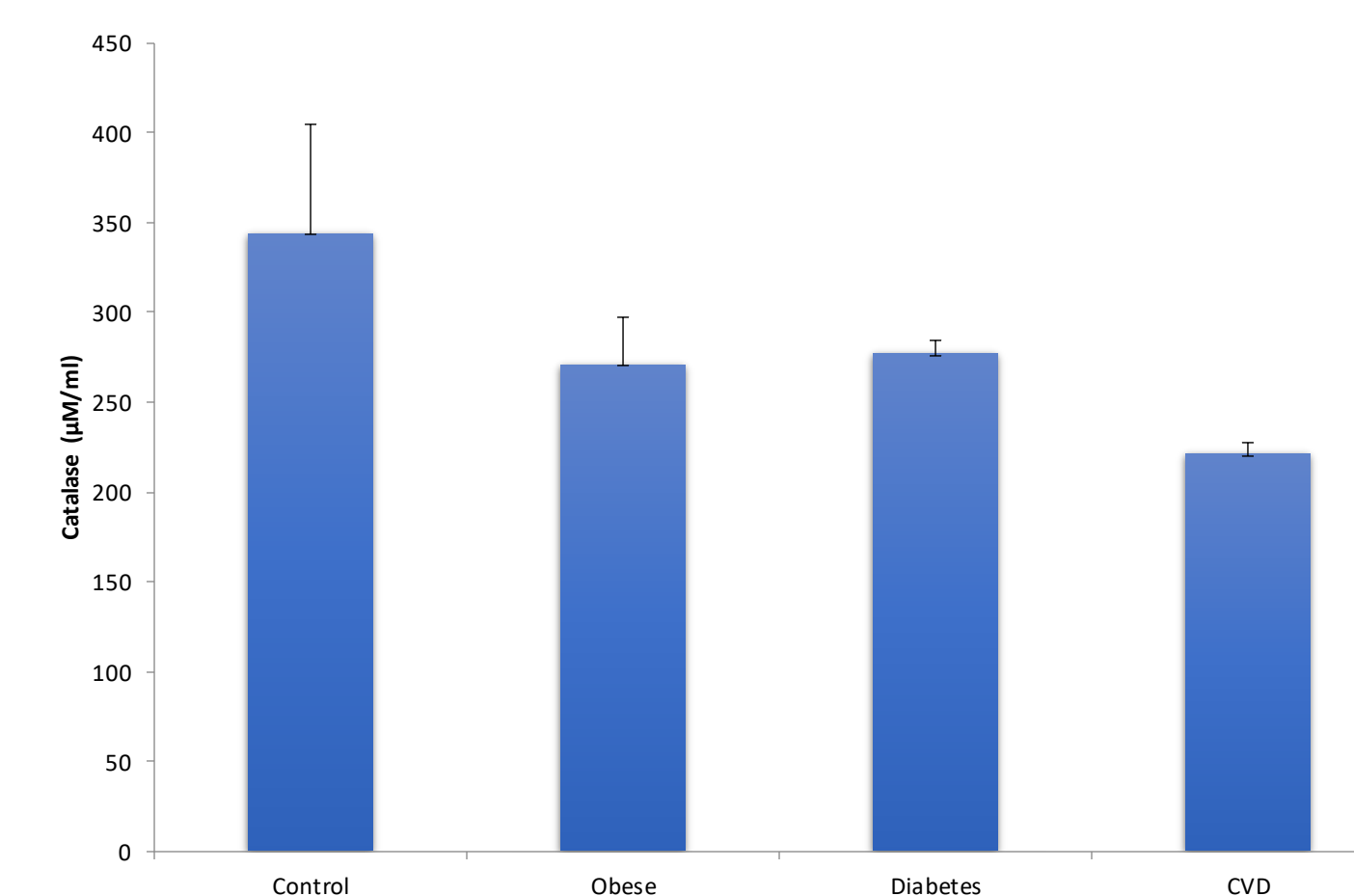
RESULTS

CLINICAL CHARACTERISTICS OF HEALTHY CONTROL SUBJECTS, OBESE, DIABETIC AND CARDIOVASCULAR DISEASE PATIENTS

Parameters	Control	Obese group	Diabetic group	Cardiovascular disease group
Age (years)	39 ± 5.65	42.66 ± 5.12	43.32 ± 4.12	68.33 ± 8.94
Height (cm)	163.43 ± 3.21	162.3 ± 4.32	163.21 ± 3.33	164.32 ± 3.35
Weight (kg)	70.21 ± 1.24	135.24 ± 19.23	119.45 ± 2.35	87.34 ± 22.10
Waist-Hip ratio	83.21 ± 2.24	92.23 ± 2.21	86.32 ± 2.25	88.32 ± 2.34
BMI (kg/m ²)	20.75 ± 3.80	29.08 ± 7.82**	28.29 ± 1.32	27.95 ± 5.25**
FBG (mg/dl)	114.66 ± 10.35	143.22 ± 22.12**	228 ± 78.25 ***	130.77 ± 74.59 *
Systolic BP	125 ± 7.071	136.66 ± 27.83	137.43 ± 22.2	146.66 ± 22.36
Diastolic BP	85 ± 7.071	87.77 ± 14.81	88.32 ± 12.12	98.33 ± 10

COMPARISON OF LIPID PROFILE OF HEALTHY CONTROL SUBJECTS, OBESE, DIABETIC AND CARDIOVASCULAR PATIENTS

Parameters	Control	Obese patients	Diabetic patients	CVD patients
Cholesterol (mg/dl)	150.77 ± 14.05	198.6 ± 63.04 *	197.6 ± 23.21*	188.86 ± 52.45 *
Triglycerides (mg/dl)	146 ± 12.09	206.66 ± 145.05	212.25 ± 15.5*	164.4 ± 108.43
HDL (mg/dl)	47 ± 5.41	40.26 ± 7.07 **	39.23 ± 2.75**	40.46 ± 10.28 *
LDL (mg/dl)	76.40 ± 29.82	99.73 ± 35.55	97.23 ± 22.35	89 ± 34.22



DISCUSSION

The study provides evidence of the relationship between oxidative stress biomarkers and anthropometric indices in obese, diabetes and CVD patient.

Obesity is a prevalence cause of different pathological conditions including oxidative stress. Oxidative stress plays pivotal role in progression and development of diabetes as well as cardiovascular diseases and its complications.

It is concluded from the present results that Catalase (CAT) and Superoxide dismutase (SOD) levels were decreased while increased lipid per oxidation were observed in obese, diabetic and CVD patients. Lipid profile and renal function test were also affected by the oxidative stress that causes the several adverse effects.

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