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# MEASUREMENT OF PLASMA HOMOCYSTIENE LEVEL AMONG SUDANESE PATIENTS WITH CARDIOVASCULAR DISEASE

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## ABSTRACT

**Background:** Elevated plasma homocysteine (Hcy) concentration is considered a risk factor for cardiovascular disease and may also be associated with hypertension. **Aim:** The aim of this study is to measure the plasma homocysteine level among Sudanese patients with cardiovascular disease. **Materials and Methods:** Across sectional study design was performed in Sudan Center Of Heart, Khartoum state, Sudan. A total of 30 samples were collected from cardiovascular disease patients, with exclusion of patients with other chronic diseases that affect the homocysteine. The data were compared by using statistical analysis performed with statistical package for social sciences (SPSS) version 11.5 by using one sample T test. **Results:** The study showed that the mean of plasma homocysteine level in patients with cardiovascular disease by micromole per liter is (14.980) which was slightly increase compared to normal range 5-14µmol/L, and the result is statistically significant different from the mean of normal values (*P*-value0.00)**. Conclusion:** Plasma homocysteine is slightly increased among Sudanese patients with cardiovascular disease (CVD).

## INTRODUCTION

Homocysteine is a sulfur amino acid and a normal intermediate in methionine metabolism. When excess homocysteine is produced in the body and not readily converted into methionine or cysteine, it is excreted out of the tightly regulated cell environment into the blood. It is the role of the liver and kidney to remove excess homocysteine from the blood. In many individuals with inborn errors of homocysteine metabolism, kidney or liver disease, nutrient deficiencies, or concomitant ingestion of certain pharmaceuticals, homocysteine levels can rise beyond normal levels and lead to adverse health outcomes.

The role of elevated blood homocysteine levels in clinical practice is still being debated. The central question is, whether it is clinically beneficial to measure for and treat elevated levels of homocysteine? evidence suggests otherwise.[1]

Homocysteine is highly cytotoxic and elevated levels within the bloodstream are believed to damage the endothelial lining of arterial vessels, which subsequently leads to inflammation and the formation of atherosclerotic plaques that eventually restrict the flow of blood to the heart and other organs.[2-3]

### Cardiovascular disease (CVD)

is any disease which affects the heart and bloodvessels (examples include coronary heart disease, peripheral arterial disease, stroke and heart failure.[4]

Cardiovascular disease refers to aclass o disease that involve the the heart and or blood vessels e.g(arteries). it is commonly related to atherosclerosis, aprocess where by fatty deposite (plagues)from the arteries, causing them to narrow and possibly block compeletly.

When atherosclerosis affect the major arteries in the body it can cause aheart attack, strock or perephral arterial disease, by recognizing the warning signs and symptoms and seeking medical care promptly, according to place where lack the blood supply the(CVD) is named, if lack in heart called (heart attack), in brain (stroke), and in hand or foot called(peripheral arterial disease).[5]

## MATERIAL AND METHODS

A cross sectional study was carried out at faculty of Medical Laboratory science, Al-Neelain University with sample comprised of 30 samples were collected from Sudanese patients with cardiovascular disease, with of patients other chronic diseases .In Sudan Center Of Heart, in Khartoum state, sudan.

Blood specimens were taken from Sudanese patients with cardiovascular disease, 3 ml of venous blood was collected in EDTA container, then blood samples were

centrifuged and the plasma transferred to new plain containers.

ELISA was used to measure plasma homocysteine level after diluted the standard then prepare the sample dilution and pipetting 40µL in testing well then covered with adhesive strip, and incubated for 30 min at $37c^0$, centrifuged, washed and added enzyme(HRP) conjugate reagent exepted blank well, then incubated washed and added 50µLchromogensolusion Bto each well after that added 50µL of stop solution to each well, finally the absorbance read at 450 nm.

## RESULTS

**Table1One-Sample Statistics of homocysteine and study group.**

| Parameter | Mean ±SD | P.value |
|---|---|---|
| HOMOCYSTIENE LEVEL Micromol/L | 14.98 ±1.2944 | 0.00 |

The results of the present study showed that the mean of plasma homocysteine level in patients with cardiovascular disease by micromole per liter is (14.980) which was slightly increased compared to normal range(5-14µmol/L). Also the results showed the slightly increase compared to (*P*- value 0.000).

The result of correlation of plasma homocysteine and the age of the study population showed no statistically significant correlation (P-value 0.145). The result of correlation of plasma homocysteine and the duration of the study population showed significant correlation (P-value 0.035).

## DISCUSSION

Homocysteine is a sulfur amino acid in normal level is important in vital roles in body like building tissues and regulate hormones ex: Insulin, but it increase more than normal level lead to serious complication in(CVD) Patients. And there hazard achieved because the Hcy is uncommon risk factor when compare with cholesterol and other lipid profile.

Homocysteine is highly cytotoxic and elevated levels within the bloodstream are believed to damage the endothelial lining of arterial vessels, which subsequently leads to inflammation and the formation of atherosclerotic plaques that eventually restrict the flow of blood to the heart and other organs.[2-3]

Cardiovascular disease is any disease which affects the heart and blood vessels(examples include coronary heart disease, peripheral arterial disease, stroke and heart failure.[4]

This study was carried out in Sudan Center Of Heart Khartoum, Sudan. And aimed to measure the plasma homocysteine among Sudanese whose suffering from cardiovascular disease(CVD), its included 30 Sudanese patients with cardiovascular disease, with exclude of normal people andpatients with other chronic diseases.

The present study revealed that slightly increase in plasma homocysteine, mean by micromoles per liter is (14.980±1.29) with confidance interval 95%, which was statistically significant compared to normal range(5-14µmol/L) (p value 0.000).

The analysis result of this study showed that no statistically significant correlation between the age of the (CVD) and plasma homocysteinelevel (p-value 0.145)**.**

Also theanalysis result of this study showed that statistically significant correlation between the duration of the (CVD) and plasma homocysteinelevel (p-value 0.035).

This study was agree with four other studies first study is:
In 1976, by Wilcken & Wilcken published the first report that coronary arterypatients frequently have abnormal Hcy metabolism.[6]

**S**econd studyafter15 years from first study, there were only scattered reports on the relation between Hcylevels and coronary artery disease, cerebrovascular disease, peripheral artery disease and venous thrombosis.[7-8]

Third studyin 1990, there has been an exponential increase in the publication rateon tHcy and cardiovascular disease. This is related to the recognitionof elevated tHcy as an independent cardiovascular risk factor.[9]

Forth studyin 1995, Boushey et al reviewed most studies on Hcy and cardiovasculardisease. Their meta-analysis, based on 27 studies including about 4000 patients, showed that Hcy was an independent, graded risk factor for atherosclerotic disease in the coronary, cerebral and peripheral vessels.[10]

The major limitations in the present study are the small sample size, and relatively short study period.

## CONCLUSION

Finally, we conclude that the patients with cardiovascular disease (CVD) have slightly increased plasma homocysteine level and this change is not influenced by the age and gender but influenced by the duration of disease.

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