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ASSESSMENT OF COPPER AND ZINC IN CARDIOVASCULAR DISEASE (CVD)

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ABSTRACT
Cardiovascular disease (CVD) class of diseases known as heart and circulatory disease. This study was carried out to assess the serum levels of copper and zinc in CVD patients Determination of trace element concentration were carried out on 40 patient with CVD and 40 healthy controls serum copper and zinc were measured by using Atomic Absorption Electro photometer. The mean serum zinc and copper levels in patients with CVD were significantly lower than control groups with P-value (0.000). In contrast the mean levels of ratio Cu\Zn was insignificantly difference in CVD patients, compared to control group (p-value 0.103) [table 3.3] The result of person correlation observed there were no correlation between copper and zinc with duration of disease and age. Low copper could lead to decreased activities of some copper-dependent enzyme. Copper depletion have revealed abnormalities of lipid metabolism, blood pressure control and electrocardiogram plus impaired glucose tolerance. Low zinc effect in immune system and protein synthesis, and lead to abnormal cell growth.

KEYWORDS: CVD, Trace elements, Zinc copper and Sudan.

INTRODUCTION
Cardio vascular disease (CVD) is one of the most prevalent diseases in developed countries and is becoming an area of increasing concern in other parts of the world.

Number of research has shown that classical and extrinsic factors such as smoking, high cholesterol levels and high blood pressure have significant role in the pathogenesis of cardiovascular disease. Recently, many other factors have been repeatedly demonstrated to influence this disease.[1] the dietary intake of minerals and in particular trace elements may have a role in the progress of atherosclerosis.[2]

Copper is essential for maintaining the structure and function of some proteins and antioxidants, deficiency or marginal intake of Cu has been proposed as a risk factor for cardiovascular diseases. Serum Cu concentration was found to be increased in atherosclerosis.[3] severe loss of serum Zn and significant increases in Cu were observed during inflammation.[4] and after cardiopulmonary bypass.[5]

Zinc is an essential trace element, critical for the function of over 300 enzymes including members of all enzyme classes and is closely involved in general metabolism of lipids, carbohydrates and proteins,[6] Zinc plays an important role in the synthesis, storage, secretion, conformational integrity of insulin monomers, and function 0f insulin. It is capable of modulating insulin action and improving hepatic binding of insulin.[7] Zinc is recognized as an integral component in a variety of glucose metabolism reactions and enhances glucose uptake into fibroblasts and adipocytes.[8] Disturbances of zinc homeostasis have been observed in diabetes and obesity.[7-9] and also have been contributed to glucose intolerance, hyperglycemia.[10.11] and hypertriglyceridemia as well as dyslipidemia. It has been reported that zinc deficiency is a risk factor of cardiomyopathy and myocardial infarction.[12.13]

MATERIAL AND METHOD
In this case control study, 40 patients with CVD and 40 controls it followed at Sudanese heart centre. Data were collected using questionnaire. Fasting venipuncture blood specimen (3ml) .was collected , samples kept in attest tube at room temperature then clotted blood sample was centrifuged at 4000 r.p.m and separated, then quickly stored at-20 then Zinc and copper concentrations measured by Atomic Absorption Electro photometer .

Ethical consideration
This study was approved by the faculty of medical laboratory Science. Al-neelain University and informed

consent will be obtained from each participant before sample collection

RESULT

The was case control study which was conducted in Sudanese heart centre .80 sample were enrolled in this study, 40 was CVD patients and 40 as control groups. Mean age of case was 35-70 and mean age of control was 35-62, 48% was male and 52%femel.

In table 3-2 the result showed that mean concentration levels of copper was significantly decreased in CVD patients (0.169±0.107) compared to control groups (0.807±0.112) with (p-value 0.000),also the mean concentration levels of Zinc was significantly decreased in CVD patients (0.179±0.214) compared to control group (0.665+0.113) with p-value 0.000.

The result of person correlation observed there were no correlation between copper and zinc with duration of disease and age.

3.1 general descriptive of baseline study population

Variables	**Mean±SD**	***P-value***
Age		
Case	52.70±12.3	0.225
Control	49.78±10.5	
Duration	5.25±2.49	
Gender	Male	Female
Case	18(45%)	22(55%)
Control	21(53%)	19(47%)

Table 3.2 mean concentration levels comparison of copper, zinc and ratio copper/zinc among case and control

Parameters	Group	N	Mean±SD	*P-value*
Copper	Case	40	0.169±0.107	0.000
	Control	40	0.807±0.112	
Zinc	Case	40	0.179±0.214	0.000
	Control	40	0.665±0.113	
Ratio Copper /Zinc	Case	40	1.651±1.511	0.103
	Control	40	1.25±0.275	

Table 3-3 correlation between study parameters and variables.

Parameters		**Age**	**Duration**	**Copper**	**Zinc**	**Ratio Copper /Zinc**
Age	***R-value***		**0.312**	**-0.011**	**0.024**	**-0.144**
	P-value		**0.05**	**0.944**	**0.881**	**0.375**
Duration	***R-value***	**0.312**		**-0.05**	**-0.219**	**-0.113**
	P-value	**0.05**		**0.758**	**0.175**	**0.487**
Copper	***R-value***	**-0.011**	**-0.055**		**-0.276**	**0.887****
	P-value	**0.944**	**0.758**		**0.085**	**0.000**
Zinc	***R-value***	**0.024**	**-0.219**	**-0.276**		**-0.402***
	P-value	**0.881**	**0.175**	**0.085**		**0.001**
Ratio Copper /Zinc	***R-value***	**-0.144**	**-0.113**	**0.887****	**-0.402***	
	P-value	**0.375**	**0.487**	**0.000**	**0.001**	

DISSCUSION

This study estimated trace element (copper and zinc) in cardio vascular disease patient. Low copper could lead to decrease activities of some copper-dependent enzyme. Copper depletion have revealed abnormalities of lipid metabolism, blood pressure control and electrocardiogram plus impaired glucose tolerance.

Low zinc effect in insulin function, immune system, protein synthesis, and lead to abnormal cell growth. The present study showed that the zinc level in the CVD patients was lower and the copper was lower. Previous study which done on CVD found that the levels of copper was not change in CVD patients but level of zinc was lower[7]. this study disagree with present study.

The present study agrees with Iranian study in 2007 which found that the levels of copper and zinc were lower in heart disease patients.[8]

CONCLUSION

Serum copper and zinc concentrations were significant lower in Sudanese patients. Patient's age and duration did not have any influence in Cu and Zn levels.

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