Dedication

To the soul of prof. Elfadil Rabia
Who first encouraged my interest in this kind of science.

To the soul of my Father
Who taught me how to feel the pain of others.

To my Mother
Who gave me care & love.

To my Family
For their abundant support and for their love.

To all patients with Chronic Renal Failure
& to all whom I love and respect.

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Abstract

This is a cross- sectional, hospital - based study was carried out to measure the levels of plasma Zinc and Copper in Sudanese chronic renal failure patients treated with chronic hemodialysis attending Selma Renal Dialysis Centre, Khartoum state, during the period from March to July 2011.

Sixty five Sudanese chronic renal failure patients treated with maintenance hemodialysis; including 40 males (aged 19-76years), and 25 females (aged 16-70years), were enrolled in this study, also thirty apparently healthy individuals to serve as control group (aged 20-60 years); including 15 males, and 15 females. Five ml of venous blood were collected from each participant, the plasma obtained; Zinc and Copper levels were measured by Atomic Absorption Spectrophotometer (AAS).

Statistical analysis of the obtained results revealed that; means of plasma levels of Zinc & Copper was significantly lower among chronic hemodialysed patients compared to control group (p value for Zinc = 0.000 ,Copper = 0.000) .

In chronic renal failure patients Plasma levels of Zinc & Copper not influenced by age, sex, or the coexisting diseases. Plasma levels of Zinc were affected by hemodialysis duration (p value 0.004), but with a weak negative correlation, where as the plasma levels of Copper not influenced by hemodialysis duration. In conclusion depletion of plasma Zinc and Copper may contribute to the disturbed trace elements concentration in hemodialysed patients, and will be consider in the

treatment & follow up of chronic hemodialysed patients to well fitness &better life.

أجريت هذه الدراسة لقياس مستويات الخارصين والنحاس في بلازما الدم لدي السودانيين المصابين بمرض الفشل الكلوى المزمن المتعالجين بالغسيل الدموى المزمن الذين يترددون على مركز سلمى لغسيل الكلى بولاية الخرطوم بالسودان فى الفتره من مارس حتى يوليو 2011 م .

اشتملت الدراسة على 65 من المرضي السودانيين المصابين بمرض الفشل الكلوى المزمن تحت علاج الغسيل الدموى المزمن , 40 منهم ذكور تتراوح اعمارهم مابين 19 الى 76 سنة و 25 من الإناث تتراوح اعمارهن مابين 16 الى 70 سنة . أيضاً إشتملت الدراسة على 30 من مجموعة الأصحاء منهم 15 من الذكور و 15 من الإناث تتراوح اعمارهم مابين 20 الى 60 سنة.

أخذت 5 مل من الدم الوريدى وتم إستخلاص بلازما الدم وتحليلها لقياس عنصرى الخارصين والنحاس بإستخدام جهاز الإمتصاص الذرى .وبعد التحليل الإحصائى لهذه النتائج وجد ان هنالك إنخفاض ذو دلاله معنويه فى متوسط مستويات الخارصين و متوسط مستويات النحاس فى بلازما الدم بالمقارنه مع مجموعة الأصحاء بمستوى معنويه (0,000) لكل من الخارصين والنحاس .من هذه الدراسة وُجد أن مستويات الخارصين والنحاس لا تتأثر بإختلاف العمر والجنس ووجود الأمراض الاخرى المصاحبه لدى هؤلاء المرضى . هنالك إختلاف ذو دلاله معنويه بين متوسطات مستويات الخارصين فى الفترات الزمنيه المختلفه للغسيل الدموى إلا ان الارتباط بينهما إرتباط عكسي ضعيف (معامل الارتباط = -0,3) أما بالنسبة للنحاس فإنه لاتوجد علاقة بين مستوى النحاس فى البلازما والفترات الزمنيه للغسيل الدموى .

ومن نتائج هذه الدراسة تم التوصل الى انه لابد من الاخذ بالاعتبار قياس عنصرى الخارصين والنحاس لعلاج ومتابعة مرضي الفشل الكلوى المزمن الذين يتعالجون بالغسيل الدموى المزمن لتحسين صحتهم وتوفيرحياة افضل لهم .

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Abbreviations

AAS: Atomic Absorption Spectrophotometer
ARF: Acute Renal Failure

BSA: Body Surface Area
BUN: Blood Urea Nitrogen
C_{Cr}: Creatinine clearance
CKD: Chronic Kidney Disease
CRF: Chronic Renal Failure
CVD: Cardiovascular disease
DCT: Distal Convoluted Tubules
DM: Diabetes Mellitus
ECC: Extracorporeal circuit
eGFR: estimated Glomerular Filtration Rate
ESRD: End Stage Renal Disease
FF: Filtration Fraction
GFR: Glomerular Filtration Rate
GN: glomerulonephritis
HD: hemodialysis
HTN: Hypertension
Mt: Metallothionein
MTF I: Metal-regulatory Transcription Factor I
NKF: National Kidney Foundation
NS: Nephritic Syndrome
P_{Cr}: Plasma Creatinine
PCT: Proximal Convoluted Tubules
PD: Peritoneal Dialysis
Ppm: Part per million
RBF: Renal Blood Follow
RPF: Renal Plasma Follow
RRT: Renal Replacement Therapy
:SODs Superoxide dismutases
U_{Cr}: Urine Creatinine