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 19-76 years), and 25 females (aged 16-70 years), 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.

Agrawat these the study for estimating levels of calcium and copper in the blood plasma of Sudanese patients with chronic renal failure, undergoing long-term hemodialysis and attending the Sultana Hemodialysis Center in Khartoum state from March to July 2011. The study included 65 of the Sudanese patients with chronic renal failure, 40 of them were males aged between 19 and 76 years and 25 of the females aged between 16 and 70 years. A group of 30 healthy individuals, 15 males and 15 females aged between 20 and 60 years was also included.

Blood samples, 5 ml, were taken from the antecubital vein and sent for analysis of calcium and copper in the blood plasma. After subjecting the obtained results to statistical analysis, a significant difference was found between the levels of calcium and copper in the blood plasma of patients compared to healthy individuals (P < 0.000). On the other hand, the study showed that the levels of calcium and copper were affected by age and gender differences, as well as by other concomitant illnesses. The association coefficient between the levels of calcium and time periods of hemodialysis was very weak (0.3), while for copper it was a weak relationship (0.3) between the level of copper and the time periods of hemodialysis. There was no relationship between the level of copper and the time periods of hemodialysis.
ومن نتائج هذه الدراسة تم التوصل إلى أنه لا بد من الانتباه بالاعتبار قياس عضد رائع الخارجين والنحاس لعلاج ومتتابعة مرضى الفشل الكلوي المزمن الذين يتعالجون بالغسيل الدموي المزمن لتحسين صحتهم وتوفير حياة أفضل لهم.
Chapter one
Introduction & Literature Review

1.1. Introduction ................................................................. 1
1.1.1. Rationale & Objectives ............................................. 3
1.2. Literature review ......................................................... 4
1.2.1. Anatomy of Kidneys ................................................ 4
1.2.1.1. Parts of Nephron .................................................. 4
1.2.1.1.1. Glomerulus ..................................................... 4
1.2.1.1.2. The proximal convoluted tubule ................................ 4
1.2.1.1.3. The loop of Henle ............................................ 4
1.2.1.1.4. The distal convoluted tubule ................................. 5
1.2.1.1.5. The collecting duct .......................................... 5
1.2.2. Physiology of Kidney ............................................... 5
1.2.2.1. Glomerular filtration ........................................... 5
1.2.2.2. Tubular Function ............................................... 5
1.2.2.2.1. Proximal convoluted tubule ................................. 5
1.2.2.2.2. Loop of Henle .............................................. 6
1.2.2.2.3. Distal convoluted tubule .................................. 6
1.2.2.2.4. Collecting duct system ..................................... 6
1.2.2.3. Renal Hemodynamics .......................................... 6
1.2.3. Function of Kidney ................................................ 7
1.2.4. Investigation of renal function .................................. 7
1.2.4.1. Test of glomerular function .................................. 7
1.2.4.1.1. Glomerular Filtration Rate ................................ 7
1.2.4.1.2. Uremia (Azotemia) .......................................... 10
1.2.4.2. Investigation of tubular function ............................. 10
1.2.5. Kidney Diseases .................................................... 11
1.2.5.1. Chronic Kidney Disease (CKD) .............................. 11
1.2.5.2. Renal Failure ................................................... 14
1.2.5.2.1. Acute Renal Failure (ARF). ............................... 14
1.2.5.2.2. Chronic Renal Failure (CRF) .............................. 14
1.2.5.2.2.1. causes of CRF ........................................... 14
Chapter Two

Materials & Methods

2. Materials and methods………………………………………………… 28
2.1. Study design ………………………………………………………… 28
2.2. Subjects……………………………………………………………….. 28
2.3. Ethical consideration………………………………………………….. 28
2.4. Data collection and clinical assessment………………………………. 28
2.5. Sample Collection …………………………………………………….. 28
2.6. Biochemical measurement of plasma Zinc & Copper…………………. 29

Chapter Three

Results………………………………………………………………………. 31

Chapter Four

Discussion, Conclusion & Recommendation

4.1. Discussion……………………………………………………………… 38
4.2. Conclusion……………………………………………………………… 40
4.3. Recommendation……………………………………………………… 41
References………………………………………………………………… 42
Appendices………………………………………………………………….. 51

List of tables

Table (1.1): National Kidney Foundation (NKF) classification of CKD……….. 13
Table (1.2): Components of standard Bicarbonate Containing hemodialysis solution ................................................................. 19
Table (3.1): Frequency of gender among patients and control groups .......... 31
Table (3.2): Frequency & percentage of patients according to duration of hemodialysis .......................................................... 32
Table (3.3): Influence of hemodialysis duration on plasma Zinc & Copper levels ............................................................ 35
Table (3.4): distribution of coexisting diseases among patients on chronic hemodialysis treatment ........................................ 36
Table: (3.5) Mean ± Std Deviation of plasma Copper & Zinc among different diseases in hemodialysis patients ........................................... 37

List of Figures

VIII
Figure (3.1): The mean of plasma Zinc among study and control groups.

Figure (3.2): The mean of plasma Copper among study and control groups.

Abbreviations

AAS: Atomic Absorption Spectrophotometer
ARF: Acute Renal Failure
BSA: Body Surface Area
BUN: Blood Urea Nitrogen
C\textsubscript{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\textsubscript{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\textsubscript{Cr}: Urine Creatinine