THE INTEGRITY OF GLUTATHIONE SYSTEM IN CHILDREN WITH CHRONIC RENAL FAILURE

THESIS

Submitted for partial fulfilment of the

Master Degree in Pediatrics

By

MAGDA MOHAMMED MOUSTAFA ALI

M.B., B.Ch.

Under the supervision of

PROF. FARIDA AHMED FARID
Professor of Pediatrics
Faculty of Medicine - Ain Shams University

DR. ZEINAB AWAD EL-SAYED
Lecturer of Pediatrics
Faculty of Medicine - Ain Shams University

DR. AZZA SADEK EL-DANASOURY
Lecturer of Clinical Pathology
Faculty of Medicine - Ain Shams University

Faculty of Medicine

Ain Shams University

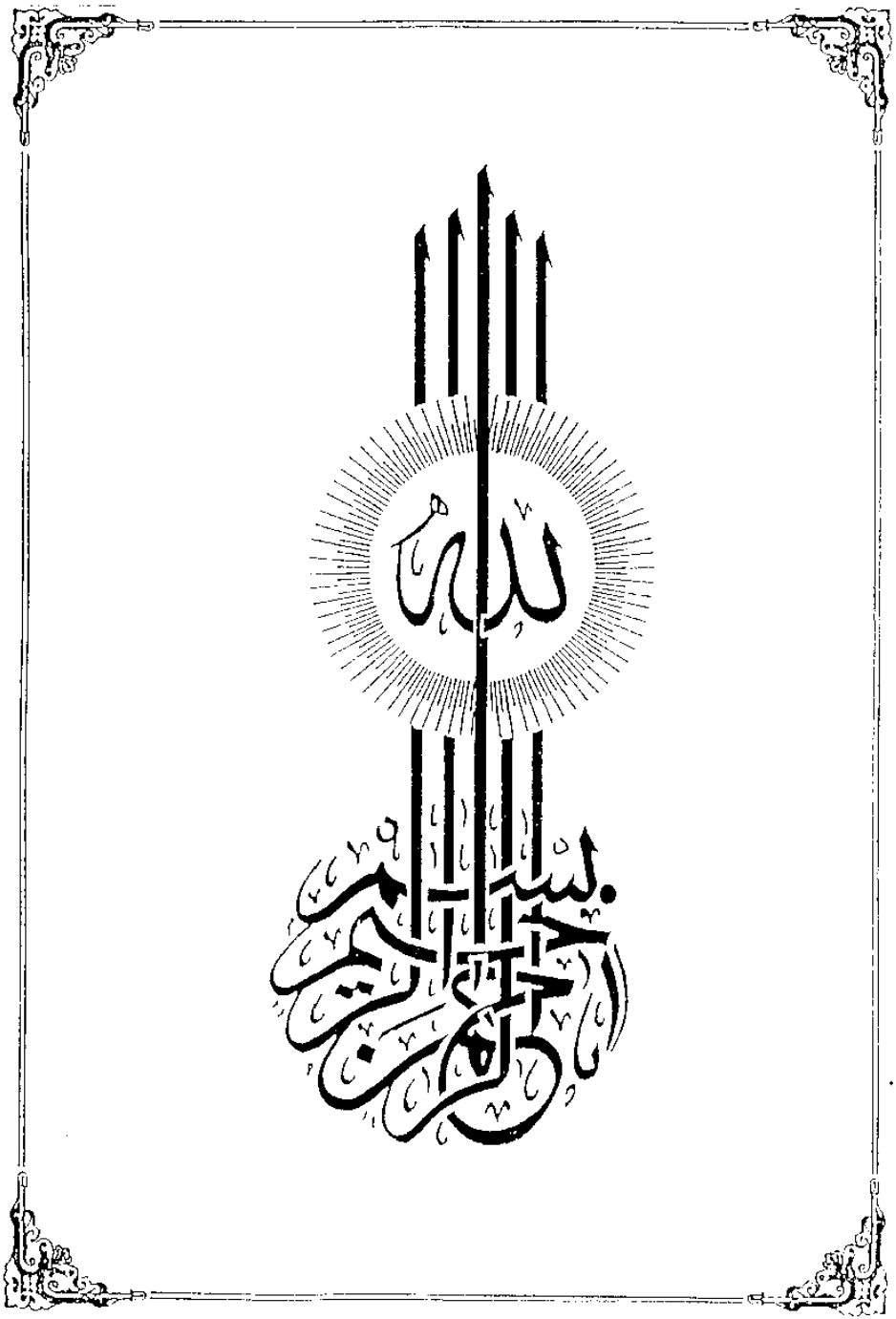
1995

بسم الله الرحمن الرحيم

« قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم .»

صدق الله العظيم

(سورة البقرة ، الآية ٣٢)



To ...

My Family

ACKNOWLEDGEMENT

Thanks to Allah.

I would like to express my utmost gratitude and thanks to the eminent ***PROF. DR. FARIDA AHMED FARID****, Professor of Pediatrics, Faculty of Medicine, Ain Shams University, for her generous help and meticulous supervision and for having devoted to me much of her precious attention and sincere advice.*

I do feel deeply indebted to ***DR. ZEINAB AWAD EL-SAYED****, Lecturer of Pediatrics, Faculty of Medicine, Ain Shams University, for her continuous encouragement and valuable guidance. I would like to thank her for her constant support and valuable remarks that have been of utmost help.*

I would like to express my sincere gratitude to ***DR. AZZA SADEK EL-DANASOURY****, Lecturer of Clinical Pathology, Faculty of Medicine, Ain Shams University, for her continuous guidance throughout the laboratory part of the work.*

I owe special thanks to ***DR. MANAL HASHEM****, Lecturer of Clinical Pathology, Faculty of Medicine, Ain Shams University, for her help and great cooperation regarding the practical part of this work.*

Many thanks to all the staff members of ***PROF. DR. YEHIA EL-GAMAL'S*** *Department, and to all my colleagues.*

Last, but not least, my deep thanks and best wishes are conveyed to the young patients of this study as well as to their parents, and the nursing staff of the Pediatric Dialysis Unit. God bless them all.

Magda Moustafa

CONTENTS

LIST OF ABBREVIATIONS

2,3-DPG	2,3-diphosphoglyceric acid.
Al	Aluminum
ATP	Adenosine triphosphate
BFU-E	Burst forming unit-erythroid
BUN	Blood urea nitrogen
CAPD	Continuous ambulatory peritoneal dialysis
CFU-E	Colony forming unis-erythroid
CRF	Chronic renal failure
DNA	Deoxyribonucleic acid
Epo	Erythropoietin
ESRD	End stage renal disease
F	Female
GFR	Glomerular filtration rate
GSH	Reduced glutathione
GSSG	Oxidized glutathione
H_2O_2	Hydrogen peroxides
Hb	Hemoglobin
HD	Hemodialysis
LOOH	Hydroperoxides
M	Male
Mn	Manganese
NADpH	Reduced nicotinamide adenine dinucleotide phosphate
Ni	Nickel
OF	Osteitis fibrosa
Plase A_2	Phospholipase A_2
pLOOH	Phospholipid hydroperoxide
RBCs	Red blood corpuscles
RIA	Radioimmunoassay
Se-GSH-PX	Selenium glutathione peroxidase
Si	Silicon
SLE	Systemic lupus erythematosus
Zn	Zinc

LIST OF TABLES

LIST OF FIGURES

Introduction

INTRODUCTION

Anemia occurs with relatively high incidence in patients affected by chronic renal failure (CRF) (*Erslew*, 1970).

It has been described as normocytic, normochromic anemia. Erythropoietin deficiency seems to be the main cause of anemia in these patients (*Giardini et al.*, 1984). The red blood cells (RBCs) of uremic patients, although reduced in number, show a shortened life span (*Jacob et al.*, 1975). The biochemical alterations involved in this event have yet to be completely clarified.

Different mechanisms have been implicated in aging and lysis of RBCs; lipid peroxidation of the RBC membrane induced by free radicals could be the most important (*Hirshman et al.*, 1981). In vitro studies demonstrate that plasma from CRF patients contains various oxidants (*Costagliola et al.*, 1987).

RBCs have several lines of defence against oxidative stresses. Reduced glutathione (GSH), together with its related enzymes, is one of the major scavengers of activated oxygen radicals in RBCs (*Aggarwal et al.*, 1984).

Red cells release oxidized glutathione (GSSG) when exposed to oxidative stresses, most probably as a consequence of an increased intracellular content of GSSG due, in turn, to increase glutathione peroxidase activity (*Costagliola et al.*, 1986).

Aim of the Work

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The aim of this study is to investigate the RBC and plasma levels of reduced and oxidized glutathione in patients with CRF in order to test indirectly the presence in plasma of oxidants which affect the integrity of the glutathione system and the possible role of hemodialysis (HD).