

**Current Status of the Implication of the Clinical
Practice Pattern in Hemodialysis Prescription in
Regular Hemodialysis Patients in Kafr Elshikh
Governorate (Sector II)**

Thesis

Submitted for Partial Fulfillment of Master Degree
in Nephrology

By

Rasha Sabry Mohammed Negm

M.B.B.CH. – Alexandria University

Under Supervision of

Prof. Dr. Abdel-Basset Elshaarawy AbdelAzim Elshaarawy

Professor of Internal Medicine and Nephrology
Faculty of Medicine – Ain Shams University

Prof. Dr. Heba Wahid Mohamed ElSaeid

Assistant Professor of Internal Medicine and Nephrology
Faculty of Medicine – Ain Shams University

**Faculty of Medicine
Ain Shams University
2016**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ كَلِمَاتٍ
فَالْحَمْدُ لِلَّهِ
عَلِيمٍ

صَدَقَ اللَّهُ الْعَظِيمُ

Aknowlegment

*First and foremost feel always indebted to ALLAH,
The Most Kind, the Most Merciful,*

*I wish to express my deep appreciation and sincere gratitude to **prof. Dr. Abdel-Basset Elshaarawy AbdelAzim**, Professor of Internal Medicine and nephrology, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

*I wish to express my great thanks and gratitude to **prof. Dr. Heba Wahid Mohamed ElSaeid**, ass. professor of Internal Medicine and nephrology, Ain Shams University, for her kind supervision, indispensable advice and great help in this work,*

*I want to thank all **my colleagues**, for their valuable help.*

*Last and not least, thank s to **my family** for their support and pushing me forward in my life.*

Rahia Sabry Mohammed Negme



List of Contents

List of Abbreviations.....	II
List Of Tables.....	VII
List Of Figures.....	IX
Introduction.....	1
Aim of the Work.....	4
<u>Review of Literature</u>	
Chapter 1 : <i>Hemodialysis Prescription</i>	5
Chapter 2 : <i>International Clinical Practice Patterns in HD Prescription ...</i>	41
Chapter 3: <i>Hemodialysis in Egypt</i>	52
PATIENTS & METHODS	60
Results	64
Discussion	97
Summary	108
Recommendations	112
References	114
Arabic Summary	

List of Abbreviations

Abb.	Full Term
ACE	Angiotensin-converting enzyme
ACT	Activated clotting time
ACTs	Activated clotting times
AHR	Adjusted hazard ratio
APKD	Acute polycystic kidney disease
ANZ	Australia and New Zealand
AT	Antithrombin.
AVF	Arterio venous fistula
AVG	Arterio venous graft
BFR	Blood flow rate
BUN	Blood urea nitrogen
CAPD	Continuous ambulatory peritoneal dialysis
CKD	Chronic kidney disease
CKD-EPI	Chronic Kidney Disease Epidemiology Collaboration
CKD-MBD	Chronic kidney disease-mineral and bone disorder
CLD	Chronic liver diseases
CRI	Catheter related infection
CVCs	Central venous catheters
CVD	Cardiovascular disease
CVS	Cardiovascular system

List of Abbreviations (Cont...)

Abb.	Full Term
DM	Diabetes Mellites
DOPPS	The Dialysis Outcomes and Practice Patterns Study
ECFV	Extracellular fluid volume
eGFR	Estimated glomerular filtration rate
EGIPT-CKD	Egypt Information, Prevention and Treatment of CKD
EKR	Equivalent renal urea clearance
eKt/V	Equilibrated Kt/V
EPO	Erythropoietin
ePTFE	Expanded polytetrafluoroethylene
Eq	Equation
ESA	Erythropoiesis-stimulating agents
ESAs	Erythropoiesis-stimulating agents
ESRD	End Stage Renal Disease
EUR	Europe
GFR	Glomerular filtration rate
HCV	Hepatitis C virus
HD	Hemodialysis
HEMO study	Hemodialysis study
Hgb	Hemoglobin
Hgb _{A1C}	Glycated hemoglobin

List of Abbreviations (Cont...)

Abb.	Full Term
HIV	Human immunodeficiency virus
HR-QoL	Health-related quality of life
HTN	Hypertension
ICU	Intensive Care Unit
IPD	Intermittent peritoneal dialysis
IV	Intra venous
K/DIGO	Kidney disease improving global outcomes
K/DOQI	Kidney disease outcome initiative
KoA	Mass transfer area co efficient
KUF	Ultrafiltration co efficient
LMW	Low Molecular Weight
MDRD	Modification of Diet in Renal Disease
MOH	Ministry of Health
MPO	Membrane Permeability Outcome
NKF-DOQI	National kidney foundation - disease outcome initiative
PRU	Percent reduction in urea
PTH	Parathyroid hormone
PTX	Parathyroidectomy
QB	The blood flow rate to the dialyzer
RDT	Renal Denervation Therapy

List of Abbreviations (Cont...)

Abb.	Full Term
rHuEPO	Recombinant Human Erythropoietin
RKF	Residual kidney function
SLE	Systemic lupus erythrmatosis
TAC	Time averaged concentration
TT	Treatment time
TMP	Trans membrane pressure
TSAT	Transferrin saturation
UF	Ultrafiltration
URR	Urea reduction ratio
US	United States of America
VDRAs	Vitamein D Receptor Activators

List of Tables

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
------------------	--------------	-----------------

REVIEW OF LITERATURE

Table 1	: Elements of Hemodialysis Prescription.....	6
Table 2	: Components of the dialysate	16

RESULTS

Table 1:	Main HD units & number of patients.....	64
Table 2	: Baseline characteristics of the study population.	65
Table 3	: Etiology of ESRD and associated co-morbidities in the study population.	67
Table 4	: Basic HD data of the study population.....	70
Table 5	: Type of vascular access and access failure in the study population.	73
Table 6	: Mean monthly Hemoglobin category in the study population.	75
Table 7	: Hemoglobin category in the study population.	76
Table 8	: Categories of Ferritin in the study population.....	77
Table 9	: Methods of treatment of anemia during the study period.	79
Table 10	: History of serum Calcium level in the study population.	82

List of Tables (cont...)

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
Table 11	Categories of Calcium levels in the study population.....	83
Table 12	History of serum Phosphorus level in the study population.	84
Table 13	Categories of Phosphorus levels in the study population.	85
Table 14	Mean monthly Ca x PO ₄ product levels in the study population.	86
Table 15	Categories of Ca x PO ₄ product levels in the study population.	87
Table 16	Categories of PTH levels in the study population.	88
Table 17	PO ₄ Binders use in the study population.	89
Table 18	Vitamin D dose (ug/wk) in the study population.	90
Table 19	Average weight gain (kg) in the study population.	91
Table 20	Anticoagulation dose in the study population.	93
Table 21	Types of complications during HD session in the study population.	94
Table 22	Criteria of dialyzers used in the study population.	96

List of Figures

<i>Figure No.</i>	<i>Title</i>	<i>Page No.</i>
<u>REVIEW OF LITERATURE</u>		
Figure 1	: A nomogram to estimate kt/V	25
Figure 2	: Changes in BUN measured after dialysis	29
Figure 3	: Common arteriovenous fistula sites	37
Figure 4	: Arteriovenous grafts	37
Figure 5	: Current proportional contribution of the most common causes of end-stage renal disease in Egypt in comparison with two North African countries	55
<u>RESULTS</u>		
Figure 1	: Main HD units & number of patients.	64
Figure 2	: Gender distribution in the study population.....	66
Figure 3	: Work status in the study population.	66
Figure 4	: Dependency status in the study population.....	66
Figure 5	: Different causes of ESRD in the study population.....	68
Figure 6	: Different comorbidities in the study population.....	68
Figure 7	: Frequency of HD sessions/week in the study population.	71
Figure 8	: Duration of HD session in the study population.....	71
Figure 9	: Sponsoring status in the study population.	72
Figure 10	: Viral status in the study population.	72
Figure 11	: Type of vascular access in the study population.	74
Figure 12	: Frequency of access failure in the study population.....	74

List of Figures (Cont...)

<i>Figure No.</i>	<i>Title</i>	<i>Page No.</i>
Figure 13	Mean monthly Hemoglobin category in the study population.	75
Figure 14	Hemoglobin category in the study population.	76
Figure 15	Categories of ferritin in the study population.	77
Figure 16	History of blood transfusion in the study Population.....	80
Figure 17	History of ESA therapy in the study population.	80
Figure 18	History of vitamins & other supplements use in the study population.	81
Figure 19	History of serum Calcium level in the study population.	82
Figure 20	Calcium levels in the study population.....	83
Figure 21	History of serum Phosphorus level in the study population.....	84
Figure 22	Categories of Phosphorus levels in the study population.	85
Figure 23	Mean monthly Ca x PO ₄ product levels in the study population.....	86
Figure 24	Categories of Ca x PO ₄ product levels in the study population.	87
Figure 25	Categories of PTH levels in the study population.	88
Figure 26	History of PO ₄ Binders use in the study population.....	89
Figure 27	Vitamin D dose (ug/wk) in the study population.....	90
Figure 28	Average weight gain (kg) in the study population.	92
Figure 29	Anticoagulation dose in the study population.....	93
Figure 30	Types of complications during HD session in the study population.....	94
Figure 31	Criteria of dialyzer used in the study population.	96

Introduction

Studies examining the link between research evidence and clinical practice have consistently shown gaps between the evidence and current practice. Some studies in the United States suggest that 30%–40% of patients do not receive evidence-based care, while in 20% of patients care may be not needed or potentially harmful.¹ However, relatively little information exists about how to apply evidence in clinical practice, and data on the effect of evidence-based guidelines on knowledge uptake, process of care or patient outcomes is limited (*Locatelli et al., 2004*).

In recent years, specific clinical guidelines have been developed to optimize the quality of anemia management secondary to chronic kidney diseases (CKD). As a result, the National Kidney Foundation Kidney Disease Outcome Quality Initiative (K\DOQ I) guidelines and the Renal-European Dialysis and Transplantation Association best practice guidelines have been published in USA & Europe. Therefore; clinical practice guidance help individual physician and physicians as group to improve their clinical performance and thus raise standard of patient care towards optimum levels, They may also help to

insure that all institution provide an equally good base line standard of care (**Cameron,1999**).

Guidelines practiced on anemia and actual practices are much different with different places and patients according to treatment. Moreover, in individual countries and individual units within countries local circumstances relating to economic conditions; organization of health care delivery or even legal constraints may render the immediate implementation of best practice guidelines difficult or impossible. Nevertheless, they provide a goal against which progress can be measured (**Locatelli et al., 2004**).

Dialysis Outcomes and Practice Patterns Study (DOPPS) has observed a large variation in anemia management among different countries. The main hemoglobin concentration in hemodialysis patient varied widely across the studied countries ranging between 8g/dl to 11g/dl. The percentage of prevalent hemodialysis patient receiving erythropoietin stimulating agent 'ESA' has increased from 75% to 83%. The percentage of HD patient receiving iron varies greatly among DOPPS countries range from 38% to 89% (**Locatelli et al., 2004**).

There are challenges in implanting clinical guidelines in medical practice. Overall DOPPS data which show that, despite the availability of practice guidelines for treatment of renal anemia, wider variation in anemia management exists as gap between what is recommended by the guidelines and is accomplished in every day clinical practice. Compliance with clinical guidelines is an important indicator of quality and efficacy of patient care at the same time their adaptation in clinical practice may be initiated by numerous factors including; clinical experts, patient performance, constrains of public health policies, community standard, budgetary limitation and methods of feeding back information concerning current practice (*Cameron, 1999*).