

**Current Status of the Implication of the Clinical
Practice Pattern in Hemodialysis Prescription in
Regular Hemodialysis Patients in Egypt
(Dakahlia Governorate- sector D)**

Thesis

**Submitted for partial fulfillment of Master
Degree in Internal Medicine**

By

Abeer Metwally Ahmed

M.B.B.CH. – Mansoura University

Under Supervision of

Prof. Dr. Yaser Soliman Ahmed

Professor of Internal Medicine and Nephrology

Faculty of Medicine – Ain Shams University

Dr. Hayam Mohamed Aref

Assistant Professor of Internal Medicine and Nephrology

Faculty of Medicine – Ain Shams University

**Faculty of Medicine
Ain Shams University**

2014



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿ قَالُوا سُبْحَانَكَ

لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا

﴿ إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴿٣٢﴾

البقرة ٣٢

صِدْقَ اللَّهِ الْعَظِيمِ

ACKNOWLEDGMENT

First ,

I wish to express my deep Thanks and sincere gratitude to **Allah** for helping me and giving me the ability to complete this work.

I would like to

express my sincere gratitude to

Prof. Dr. Yaser Soliman Ahmed,

Professor of internal medicine and nephrology, Faculty of Medicine, Ain Shams University, for his supervision, instructions and guidance. It was a great honor to me to work under his direct supervision.

My deep thanks to

Prof. Dr. Hayam Mohammed Aref,

Assistant Professor of internal medicine and nephrology, Faculty of Medicine, Ain Shams University, for her supervision, continues support and great help in this work.

I would like to dedicate this work to my family and finally to my husband for their emotional support and continues encouragement.

List of Contents

Title	Page
• List of Abbreviations	II
• List of figures	VII
• List of Tables	IX
• Introduction	1
• Aim of the Work	3
• Review of the Literature	
▪ Chapter (I): Hemodialysis in Egypt	4
▪ Chapter (2): Hemodialysis prescription	10
▪ Chapter (3): Hemodialysis complications	33
▪ Chapter (4): Guidelines for Hemodialysis patients	51
• Patients and Methods	91
• Results	96
• Discussion	118
• Summary and Conclusion	128
• Recommendations	131
• References	132
• Arabic Summary	v

List of Abbreviations

ACE	Angiotensin converting enzyme
AN	Acrylonitrile
APKD	Adult polycystic kidney disease
ARF	Acute renal failure
AVF	Arteriovenous fistula
AVG	Arteriovenous graft
BFR	Blood flow rate
BMI	Body mass index
BMD	Bone mineral density
BP	Blood pressure
BUN	Blood Urea Nitrogen
CAPD	Continuous ambulatory peritoneal dialysis
CHC	Chronic hepatitis C
CLD	Chronic liver disease
CKD	Chronic kidney disease
CMS	US Centers for Medicare and Medicaid Services
COPD	Chronic obstructive pulmonary disease
CHF	Congestive heart failure

CPR	Cardiopulmonary resuscitation
CRP	C-reactive protein
CVC	Chronic venous catheter
CVD	Cardiovascular disease
C	Convection
CSF	Cerebrospinal fluid
CQI	Continuous Quality improvement
CKDND	Chronic kidney disease non dialysis
CBC	Complete blood count
DFR	Dialysate flow rate
D	Diffusion
DVPS	Dynamic venous pressures
DM	Diabetes mellitus
DDS	Dialysis disequilibrium syndrome
DOPPS	Dialysis outcome and practice pattern study
E GFR	Estimated GFR
ECF & ICF	Extra and itra cellular fluid
EPO	Erythropoietin
ERA-EDTA	The European Renal Association European Dialysis and Transplantation association
ESA	Erythropoietin simulating agent

ESRD	End stage renal disease
FDA	Food and drug administration
G/DL	Gram per deciliter
GFR□	Glomerular filtration rate
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HD	Hemodialysis
HDF	Hemodiafiltration
Hb	Hemoglobin
HF	Hemofiltration
HIV	Human immune deficiency virus
HTN	Hypertension
IDH	Intradialytic hypotension
IPD	Intermittent peritoneal dialysis
ISHD	Ischemic heart disease
IU	International unite
IV	Intravenous
K/DOQI	Kidney Disease Outcome Quality Initiative
KDIGO	Kidney disease improving global outcomes
KOA	The mass transfer area coefficient

KT/V	K= effective dialyzer urea clearance in milliliters per minute t= time in minutes V= volume of the patient's urea distribution in milliliters
K _{uf}	The ultrafiltration coefficient
LMWH	Low molecular weight heparin
LVH	Left ventricular hypertrophy
MBD	Mineral bone disease
MCV	Mean corpuscular volume
MRA	Magnetic resonance angiography
MOH	Ministry of health
NKF	National Kidney Foundation
OU	Osmotic ultrafiltration
PD	Peritoneal dialysis
PEM	Protein energy malnutrition
PTFE	Polytetrafluoroethylene
PU	Polyurethane
PTH	Parathyroid hormone
PVD	Peripheral vascular disease
PRCA	Pure red cell aplasia
QD	Dialysate flow rate
QIP	Quality improvement programs

QOL	Quality of life
QA	Quality assurance
RKF	Residual kidney function
RRT	Renal replacement therapy
S.ca	Serum calcium
SD	Standard deviation
spKt/V	Single-pool delivered Kt/V (by dialysis only, exclusive of RKF)
SRI	Solute removal index
SUN	Serum urea nitrogen
TMP	Transmembrane pressure
TSAT	Transferrin saturation -
UF	Ultrafiltration
UK	United Kingdom
UKM	Urea kinetic modeling
UpostHD	Urea post hemodialysis
UpreHD□	Urea pre hemodialysis
URR	Urea reduction ratio
USA□	United States of America□
WHO□	World Health Organization

List of Figures

Fig. No.	Title	Page No.
1	Diffusion, osmosis, and osmotic ultrafiltration by osmotic pressure. (b) Hydrostatic ultrafiltration. D diffusion, O osmosis, OU osmotic ultrafiltration, UF ultrafiltration by hydrostatic pressure, C convection□	14
2	Haemodialysis Apparatus	24□
3	Dialysis circuit□	25□
4	Standard extracorporeal circuit.□	26□
5	Gender distribution in the study population□	96
6	Different causes of ESRD in the study population	97
7	Different comorbidities in the study population	98
8	Work status in the study population	99
9	Dependency status in the study population	100
10	Frequency of HD sessions/week in the study population	100
11	Sponsoring status in the study population	102
12	Type of vascular access in the study population	103□
13	Frequency of access failure in the study population□	104□

Fig. No.	Title	Page No.
14	History of blood transfusion in the study population□	106□
15	Types of ESA used by the study population	107□
16	Frequency of different doses of ESA□	108
17	ESA brand used by study population	108□
18	History of iron injection in the study population□	109□
19	History of vitamins use in the study population□	110□
20	Different types of phosphorus binders used by the study8population.□	112
21	Vit D analogue use by study population	113
22	Types of complications during HD session in the study population.	114
23	Viral status in the study population.	115
24	Criteria of dialyzer used in the study population.	116
25	Anticoagulation use by study population	117

List of Tables

Fig. No.	Title	Page No.
1	The most common diseases causing ESRD in Egypt□	5
2	Elements of the dialysis prescription	15□
3	Dialyzer classification.□	21□
4	the development of clinical practice guidelines KDIGO 2009 □	52□
5	Data collection sheet for Hemodialysis prescription in Egypt study.□	93
6	Different causes of ESRD in study population.	97
7	Different comorbidities in the study population	98
8	Work status in the study population.	99
9	Dependency status in the study population	99
10	Dialysis duration in the study population	100
11	Frequency of HD sessions/week in the study population	100□
12	Duration of HD sessions in the study population□	101□
13	Sponsoring status in the study population.□	101□
14	Status of UUR, dry weight and average interdialytic weight	102□
15	Type of vascular access in the study population	103□

Fig. No.	Title	Page No.
16	Frequency of access failure in the study population.□	104
17	The levels of Hemoglobin ,MCV, Iron study	105□
18	History of blood transfusion in the study population□	105□
19	Different types of ESA used by the study population□	106□
20	ESA Dose And Brand Used By Study Population.□	107
21	History of iron injection in the study population.	109
22	iron injection dose in the study population	109
23	History of vitamins use in the study population.	110
24	The levels of Calcium, phosphorus in study population.	111
25	PTH levels in the study population	112
26	Different types of phosphorus binders used by the study population	112
27	Use of vit D analogues.	113
28	Types of complications of HD in the study population	114□
29	Viral status in the study population.□	115□
30	Criteria of dialyzer used in the study population.□	116□
31	Criteria of dialysate used in the study population.	116□
32	Anticoagulation use in the study population	117□

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. 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.

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.