An-Najah National University

Faculty of Graduate Studies

Nursing Clinical Assessment to Predict Cardiac and Pulmonary Events in the End-Stage Renal Disease (ESRD)

By

Shatha Ghanem

Supervisor

Jamal Qaddumi

This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Critical Care Nursing, Faculty of Graduate Studies, An-Najah National University, Nablus - Palestine.

2021

Nursing Clinical Assessment to Predict Cardiac and Pulmonary Events in the End-Stage Renal Disease "ESRD"

By

Shatha Ghanem

This Thesis was Defended Successfully on 16/11/2021 and approved by:

Defense Committee Members	**Signature**
– Dr. Jamal Qaddumi / Supervisor	**……**
– Dr. Ahmad Ayed / External Examiner	**……**
– Dr. Mariam Amer Altell / Enternal Examiner	**……**

Dedication

To the one who conveyed the message, fulfilled the trust and advised the nation, to the first teacher.. and the best creation of the wilderness.. to the prophet of mercy and the light of the worlds. (Our Master Muhammad, may God bless him and grant him peace).

To those who wrote with their blood the most wonderful and purest pages of glory, giving and sacrifice to the martyrs of Palestine.

To the blessing of life and my ideal that I hoped for to give us a moment of happiness, to the one who harvested the thorns from my path to pave the way for me knowledge and taught me challenge and steadfastness to overcome difficulties, to the great and generous heart, who bears your name with pride and honor .. To my role model and the first and major supporter in my educational career For you, Abi Samir Ali Ghanem.

To the one who carried me here on the weakness that God made heaven under her feet To Rehana the spring of my life who showered me with her kindness and tenderness and who never sting me with her prayers To the one who illuminated the path of my life To the one who grows the purest flowers To the one who makes my heart happy to find it.. To the one who taught me tenderness and patience To the one who loved me unconditionally and gave unconditionally, to my dear mother, Nayfa Abdullah Ghanem.

To my support in this life, to the one who planted in me a great ambition, to the owner of a big heart and a bright face, to the shining light in my life, to the one who made me his princess since my childhood, my companion in my educational path and always tender, to my dear uncle, my soul, Abu Hanani.

To the one whom fate brought me together to be my life partner and my other half, to the one who supported me with all his strength, to the companion of the path, to the one who shared with me moments of weakness and strength, to the one who was able to be my husband, friend and lover to my dear husband Khidir Elias Abu Saada.

To those who shared with us my mother's womb, and they showed me that they are the most beautiful thing in life, to whom the garden of my heart bloomed with their presence, to my support and strength, my dear brothers (Alaa, Allam, Ali, Abeer).

To the beloved of my heart, my mother and my dear sister (Abeer Samir Ghanem), who supported me and immersed me in her love from a young age, along with her husband and children.

To my second mother (Samira Al-Khatib), who gave me everything I love, always tender, the source of my happiness and psychological comfort, and to the one who made everything difficult, she and her husband, Mr. Abdullah Bani Odeh.

To the one who brought me the most beautiful days with them, and we shared moments of joy and sadness together, to my classmates, and my work colleagues.

To my extended family and to those who planted a kind word in my heart one day.

Acknowledgement

First, I give all the glory to God, the source of my strength; I would like to express my gratitude to my awesome supervisor Dr. Jamal Al-Qaddoumi . Furthermore I would like to thank the head of Nursing and Midwifery College Dr. Aidah Alkaissi for her support through the learning process. In addition I would like to thank Dr. Osama Sawalmeh for his precious support.

Last but not the least; I would like to thank my family, my parents and lovely ones, for supporting me throughout my life. This accomplishment would not have been possible without them.

Shatha Ghanem

2021

الإقرار

أنا الموقعة أدناه، مقدمة الرسالة التي تحمل العنوان:

Nursing Clinical Assessment to Predict Cardiac and Pulmonary Events in the End-Stage Renal Disease (ESRD)

أقر بأن ما اشتملت عليه هذه الرسالة أنما هو نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وان هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أيّ درجة أو لقب علميّ لدى أي مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher`s own work and has not been submitted from anywhere else, for any other degree or qualification.

Student`s name: **اسم الطالبة:** سزى غانم

Signature: **التوقيع**

Date: **التاريخ:** 2021/11/16

Table of Contents

Acknowledgement V
Declaration VI
Table of Contents VII
List of Tables IX
List of Figures X
List of Abbreviations XIII
Abstract XIV
Chapter One: Introduction & Background 1
1.1 Introduction: 1
1.2 Problem Statement: 5
1.3 Study Objective: 5
1.3.1 Specific aims: 6
1.3.2 Resources available 6
1.4 Study Hypotheses 6
1.5 Study Variables 6
1.5.1 Independent variable 6
1.5.2 Dependent variable 7
Chapter Two: Theoretical Framework & Related Studies 8
2.1 Theoretical Framework: 8
2.1.1 Pulmonary Congestion 8
2.1.1.1 Definition of Pulmonary Congestion 8
2.1.1.2 Causes of Pulmonary Congestion 9
2.1.1.3 Pulmonary Congestion Symptoms: 10
2.1.1.4 Treatment of Pulmonary Congestion: 11
2.1.2 Cardiac Events 11
2.1.2.1 Definition of Cardiac Events 11
2.1.2.3 Risk Factors of Cardiovascular Disease 12
2.1.3 End-Stage Renal Disease (ESRD) 12

2.1.3.1 Definition of End-Stage Renal Disease (ESRD) 12
2.1.3.2 Causes of ESRD 13
2.1.3.3 Risk factors for ESRD 14
Chapter Three: Methodology 23
3.1 Study Design 23
3.2 Study Setting 23
3.3 Study Population 24
3.4 Study Sample Size 24
3.5 Inclusion & exclusion Criteria 24
3.5.1 Inclusion Criteria 24
3.5.2 Exclusion Criteria 24
3.6 Selection of the Study Tools 25
Total body water were estimated using the following classic formulas: (Watson, Watson & Batt, 2008) 26
3.7 Ethical Consideration 26
3.8 Data Collection Procedures 27
Chapter Four 29
Results 29
Introduction: 29
Chapter Five 44
Discussion 44
Recommendations 56
Conclusion 56
References 57
Appendice 64
الملخص: ..... ب

List of Tables

Table 1: Demographic Characteristics of the Participants (N= 199)..... 30
Table 2: Area Under the Curve (AUC) values for selected variables to predict mortality.....43

List of Figures

Figure 1: The difference between cardiogenic or non-cardiogenic pulmonary edema 10

Figure 2: The difference between normal kidney and deceased kidney..... 13

Figure 3: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 1st follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Second follow up month:..... 31

Figure 4: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 2nd follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Third follow up month: 32

Figure 5: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 3rd follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Fourth follow up month:..... 33

Figure 6: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 4th follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Fifth follow up month:..... 34

Figure 7: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 5th follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during the 6th follow up month: 35

Figure 8: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 6th follow up month A comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants weight during the six-month follow-up period: ... 36

Figure 9: Weight comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants complain during the six-month follow-up period: 37

Figure 10: Complains comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' admissions during the six-month follow-up period: 37

Figure 11: Admissions comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Pre TBW during the six-month follow-up period: 38

Figure 12: Pre TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Post TBW during the six-month follow-up period: 39

Figure 13: Post TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Variability of TBW during the six-month follow-up period: 40

Figure 14: Variability of TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the

six-month follow-up period, Hemodialysis participants' edema during the six-month follow-up period:..... 41
Figure 15: Edema comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period..... 42
Figure 16: values for selected variables in prediction of hospital mortality outcome groups..... 43

List of Abbreviations

Abbreviation	Meaning
COPD	Chronic obstructive pulmonary diseases
CVD	Cardiovascular disease
CKD	Chronic kidney disease
ESRD	End-Stage Renal Disease
PAWP	Pulmonary artery wedge pressure
PVR	Pulmonary vascular resistance
CO	Cardiac output
EF	Ejection fraction
RT	Renal transplantation
MACEs	Major adverse cardiac events

Nursing Clinical Assessment to Predict Cardiac and Pulmonary Events in the End-Stage Renal Disease (ESRD)

By
Shatha Ghanem
Supervisor
Jamal Qaddumi

Abstract

This study aimed to assess the effectiveness of nursing clinical assessment and fluids retention in predicting cardiac and pulmonary events in ESRD patients. The researcher used a prospective study design which means taking a cohort of subjects and watching them over a long period. This study was conducted in Palestine, at An-Najah National University Hospital in the hemodialysis department. The research sample included (280) patients of the Department of the artificial kidney at An-Najah National University Hospital.

The study findings showed that the patients who have died have higher averages of body weight, complaints, and episodes of hospitalizations than their counterparts in the unit during the 6-month study period, with regard to the patients on hemodialysis, there has been found that there is an inverse relationship between the BMI and the risk of death which has been proved by many previous studies as the higher baseline Body mass index BMI is associated with better outcomes.

The change in the total fluids in the body between before dialysis and after dialysis (which reflects the ultrafiltration or, inter-dialytic weight gain), the differences and variations were wider in the deceased patients compared with the rest of the kidney dialysis disease study participants, whose results reflected relative stability of the differences between the percentage of total body fluids before and after dialysis. There is a strong correlation between the rapid fluid removal (more than 10ml/kg/hr) during dialysis and greater

mortality rates and this is attributed to the end-organ ischemia from overt and subclinical hemodynamic instability. Alive patients were associated with lower rates of hospital admission episodes compared with the deceased ones. It is well-known that patients on chronic hemodialysis are at high risk for hospitalization compared with the general population.

The researcher recommended that:

1. Increasing the duration of dialysis in hospitals to 4 continuous hours, so that fluids can be withdrawn without burdening the patient.
2. Work to monitor the patient's dry weight more frequently by implementing nursing and clinical assessment, so that patients are constantly followed up to see any development in the patient's health.
3. Further studies are highly recommended to evaluate the effectiveness of other nursing clinical assessment in predicting the outcomes and the comorbidities of the patients.

Chapter One

Introduction & Background

1.1 Introduction:

Initial Nursing Assessment, which is the first step in the five steps of the nursing process, includes the regular and continuous collection of data; sorting, analyzing, and organizing that data; and documenting and communicating the data collected (Dunham & MacInnes, 2018). Critical thinking skills applied during the nursing process provide a decision-making framework for developing and directing a patient care plan that incorporates concepts of evidence-based practice. This rigorous education concept of designing care based on an individual's unique cultural, spiritual, and physical needs, rather than a trial by error, one size fits all approach results in a more favorable outcome (Allen et al., 2018).

Nursing assessment includes gathering information regarding a patient's individual physiological, psychological, social, and spiritual needs. It is the first step in a successful evaluation of the patient. An integral part of this process is the collection of subjective and objective data. Part of the assessment involves collecting data by obtaining vital signs such as (temperature, respiratory rate, heart rate, blood pressure, and pain level using an age- or condition-appropriate pain scale) (Abdul-kareem et al., 2019). The assessment determines the patient's current and future care needs by allowing the formation of a nursing diagnosis. The nurse learns about the patient's normal and abnormal physiology and helps prioritize interventions and care (Toney-Butler & Unison-Pace, 2021).

Chronic kidney disease (CKD) requires a thorough clinical evaluation in order to effectively assess, diagnose and treat the underlying condition. It is

important that nurses have a good knowledge and understanding of the relevant available investigations to provide effective support, patient education, and the ability to effectively manage the kidney patient (Mahon et al., 2013).

Chronic kidney disease (CKD), or chronic kidney failure, expresses the gradual damage of kidney function. Kidneys filter wastes and excess fluids from blood, which are then expelled in urine. When CKD reaches an advanced stage, dangerous levels of fluid and wastes may accumulate in the body. In the early stages of chronic kidney disease, there could be few symptoms. Chronic kidney disease may not become apparent until kidney function is significantly weakened (Yan, Chao & Lin, 2021).

End-stage renal disease (ESRD) is considered the fifth and last stage of chronic kidney disease (CKD), which occurs when kidney function is lost down to a highly advanced condition. In patients with renal disease in its final stages of dialysis (ESRD), clinical outcomes of these patients are worse than those with other kinds of renal failure (Zoccali, Mallamaci, Torino, Bellantoni, Tripepi & Tripepi, 2013).

Chronic kidney disease is a modern-day disease distinguished by progressive loss of kidney function over time. The development of CKD is related to several of serious complications, such as increased incidence of anemia, renal bone, uremic malnutrition, hyperlipidemia and cardiovascular disease (Swanepoel, Atta, D'Agati, Estrella, Fogo, Naicker, Post & Wearne, et al. 2018).

Cardiovascular disease is a class of diseases that contain the heart and/or blood vessels (e.g. arteries). It is related to atherosclerosis, a process whereby fatty deposits form in arteries, causing them to narrow and even close entirely, which can lead to a heart attack, stroke or peripheral arterial

disease. By being aware of the warning signs and symptoms and requesting medical care promptly, one may reduce the severity of a critical lack of blood supply to the heart (heart attack), brain (stroke) or hands and feet (peripheral arterial disease) (Levine, 2016).

The wide prevalence of cardiovascular disease was noted in patients with renal disease in its final stages (ESRD) receiving dialysis treatment. This is usually a mixture of vascular disease and myocardial infarction associated with risk factors like ischemic heart disease, arrhythmias, congestive heart failure, in addition to peripheral vascular disease (Aoki & Ikari, 2017).

Respiratory disorders are widespread complications in patients with renal disease in its final stages. A diversity of pulmonary deformities, including pulmonary embolism, pleural effusion, acute respiratory distress syndrome, pulmonary fibrosis, calcification, pulmonary hypertension, hemosidroidase, pulmonary fibrosis and sleep apnea syndrome were identified in these patients. The weakness in lung function may be a directly because of urinary toxicity or may be indirectly caused by increased fluid load, anemia, immune suppression, osteoporosis, malnutrition, electrolyte disorders, and/ or acid imbalances, which are common problems in renal disease in its final stages receiving dialysis treatment (Yilmaz, Yildirim, Kara, Yilmaz, Taylan, Demir, Coskunsel & Kadiroglu, 2016).

Symptomatic clinical pulmonary congestion is one of the main results of fluid accumulation through mammography in HD; especially among patients with ventricular function (almost half of patients with asymptomatic End-stage renal disease “ESRD” have impaired left ventricular “LV” function). In patients with left ventricular “LV” disorders, even excess in size may lead to shortness of breath and complete “HF” heart failure. The double impact of excess volume and left ventricular

“LV” disturbances on water gathering in the lungs is summarized by noting that about 30 percent of patients who enter the sessions of chronic dialysis have symptoms of “HF” heart failure, i.e. clinical congestion (Aoki & Ikari, 2017).

The cohabitation with lung disease or changes caused by renal dysfunction or exposure to renal membranes may raise the danger of lung congestion for the patients of dialysis. This phenomenon is closely related to inflammation that increased particularly the levels of interleukin 6 and 1 underlying the underlying serious role of the kidney in maintaining the balance of cytokine in the blood and safety of lung function. Activating and isolating neutrophils of leukocytes by the cuprophan blood membrane in the dialysis filter, a phenomenon that can be quickly reversed and occurring in each dialysis session may cause lung microvascular disease in patients taking Hemodialysis (HD) (Gluhovschi, Velclov, Ligia & Gluhovschi, 2014).

About 65 million individuals have mild to severe chronic obstructive pulmonary diseases (COPD), about 3 million people die from it each year, making it the third leading cause of death worldwide - and the numbers are growing. Lung and heart diseases are of the most difficult diseases which take a long time to discover, in addition to the high costs of treatment. When a disease does occur, the aim is to minimize its effects and treat it, if possible. The best way to minimize its effects is early detection, prompt diagnosis, and effective early treatment. Successful treatment is based on sound medical evidence, is cost-effective, and generally conforms to standardized guidelines. Patients and healthcare workers can manage diseases better if they are properly trained and necessary resources are available (Forum of International Respiratory Societies. 2017). Our study

aims to assess the effectiveness of nursing clinical assessment and fluids retention in predicting cardiac and pulmonary events in ESRD patients.

1.2 Problem Statement:

Cardiovascular disease “CVD” traditional risk factors represented in; increased age, hypertension, dyslipidemia, diabetes, smoking, and obesity are risk factors for chronic kidney disease "CKD" as well as common in patients with CKD, but most of cardiovascular complications have already been recognized and developed with the time when patients begin dialysis therapy. This suggests the need for early and more active cardiovascular disease testing even before patients reach kidney disease at the end of the stage due to the high incidence of cardiovascular complications and deaths in dialysis patients. It is important to recognize health issues related to fluids retention in order to avoid related hard cardiac events. Pulmonary and cardiac diseases need experience and expensive tools such as ultrasound, echo, ECG, and also need time and money, which may not be available. Therefore, this study provides an insight into the effectiveness of Nursing Clinical Assessment to predict Cardiac and Pulmonary Events in ESRD, where we want to test the fluids in the patients, whether they have or not have symptoms or complains, and this is the first study in Palestine in this regard.

1.3 Study Objective:

This study objective is to assess the effectiveness of nursing clinical assessment and fluids retention in predicting cardiac and pulmonary events in ESRD patients.

1.3.1 Specific aims:

1- To assess the effectiveness of auscultating breathing sound in predicting the pulmonary congestion and events.

2- To assess the effectiveness of Auscultating heart sound to predict cardiac events.

3- To assess the effectiveness of measuring biting edema to predict any cardiac or pulmonary events.

4- To assess the effectiveness of measuring fluid to predict any cardiac or pulmonary events.

1.3.2 Resources available

Book resources are available in the university library and in the internet libraries.

1.4 Study Hypotheses

- H0: There is relationship between predialysis nursing clinical assessment and cardiac/pulmonary event leading to hospitalization.
- H1: There is no relationship between predialysis nursing clinical assessment and cardiac/pulmonary event leading to hospitalization.

1.5 Study Variables

1.5.1 Independent variable

1- Weight.

2- Height.

3- Age.

4- Marital status.

5- Number of dialysis sessions per week.

6- Job.

1.5.2 Dependent variable

The effectiveness of nursing clinical assessment and fluids retention in predicting cardiac and pulmonary events in ESRD patients.

Chapter Two

Theoretical Framework & Related Studies

2.1 Theoretical Framework:

2.1.1 Pulmonary Congestion

2.1.1.1 Definition of Pulmonary Congestion

(Matthay & Murray, 2016) defined pulmonary edema “PE” as excessive extravascular water in the lungs is a common and serious clinical problem. “PE” can be dangerous on life, but effective treatment is available to save patients from the severe consequences of impaired lung fluid balance, which can be identified and, in many cases, corrected. Because rational and effective treatment depends on the understanding of the basic principles of transporting normal, abnormal, dissolved fluids and protein in the lungs.

Whereas, Lust (2007) defined pulmonary edema “PE”, as a common symptom of heart failure “HF”, happens when surplus fluid gathers in the pulmonary interstitial spaces. The total amount of interstitial fluid flow is determined by the balance between the effects of hydrostatic forces and osmotic pressures. Since the pulmonary circulation is already a low-pressure system, and because the osmotic gradients generated are relatively small, slight increases in venous pressure (left atrial pressure) nullify the osmotic effect more easily than with systemic capillaries by maintaining the hydrostatic loss, with the ensuing of Pulmonary edema. Defects in the circulatory system cause backups that generally appear with increasing pressures, and appear more rapidly in lower pressure systems, i.e., left heart failure = pulmonary edema, right heart failure = ascites, and hepatic edema.

Pulmonary edema depends as much on gravity as on pulmonary blood flow.

2.1.1.2 Causes of Pulmonary Congestion

Pulmonary edema may be cardiogenic or non-cardiogenic. A pulmonary artery wedge pressure (PAWP) greater than 18 mmHg defines cardiogenic pulmonary edema. Pulmonary edema that occurs after a myocardial infarction is usually the result of left ventricular systolic dysfunction. It may or may not be associated with systemic hypo-perfusion. By contrast, 'flashing' pulmonary edema is usually associated with preserved systolic function, and the decompensation is often caused by diastolic dysfunction secondary to a hypertensive crisis. Other reasons for cardiogenic pulmonary edema involve acute aortic and mitral valve disease, arrhythmias, atrial myxomas, and high-output states, such as anemia and thyrotoxicosis (Doughty & Sidebotham, 2007).

Pulmonary congestion symptoms and signs of include dyspnea, cough, orthopnea, paroxysmal nocturnal dyspnea, respiratory distress (tachypnea, use of accessory muscles), central cyanosis, an S3 gallop, and crackles and wheezes on chest auscultation. Jugular venous pressure may or may not be elevated. Patients with alveolar edema usually present with respiratory distress and hypoxemia and may produce copious, frothy sputum. Patients usually have hyperventilation, which leads to hypocarbonate and respiratory alkalemia. Hypercarbia and respiratory acidemia occur late and indicate impending cardiorespiratory arrest (Culver & Glenny, 2012).

The following figure shows the difference between cardiogenic or non-cardiogenic pulmonary edema:

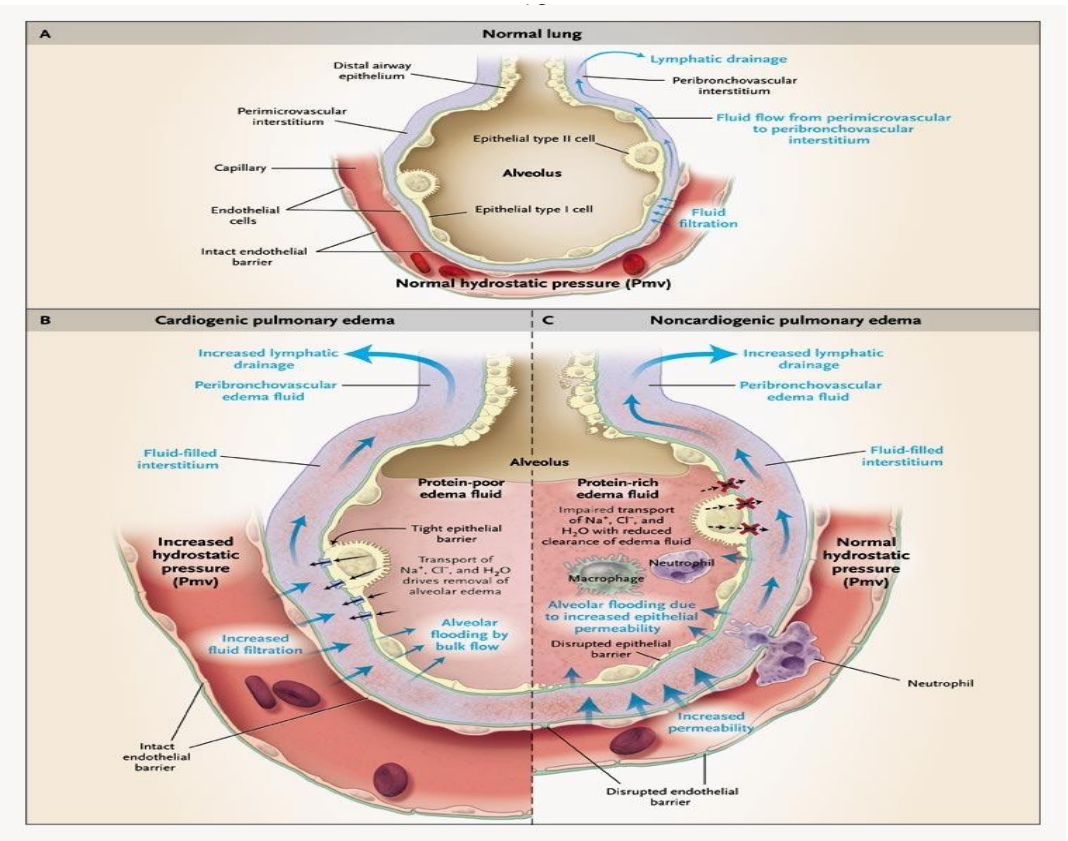


Figure (1): The difference between cardiogenic or non-cardiogenic pulmonary edema (source: Culver & Glenny, 2012)

2.1.1.3 Pulmonary Congestion Symptoms:

Pulmonary edema has many symptoms such as (shortness of breath or breathlessness). This may be a gradual onset if the process progresses slowly, or it can have a sudden onset in the case of acute pulmonary edema. Other common symptoms may include easy tiredness, shortness of breath that develops more quickly than usual with usual activity (dyspnea on exertion), rapid breathing (tachypnea), dizziness, or weakness (Beckerman, 2017).

Low blood oxygen levels (hypoxia) can be detected in patients with pulmonary edema. Furthermore, when examining the lungs with a stethoscope, the doctor may listen for abnormal lung sounds, as rales or

crackles (short intermittent bubble sounds corresponding to fluid splashing into the alveoli during breathing) (Mattu, 2015).

2.1.1.4 Treatment of Pulmonary Congestion:

The patient is given oxygen through a face mask or prongs - tiny plastic tubes in the nose, to raise the blood oxygen levels. A breathing tube may be placed into the trachea if a ventilator, or breathing machine, is necessary. If tests show that pulmonary edema is caused by a circulation problem, the patient will be treated with intravenous medications to help remove fluid volume and control blood pressure (Baird, 2010).

2.1.2 Cardiac Events

2.1.2.1 Definition of Cardiac Events

Cardiovascular disease “CVD” refers to the type of diseases that involve the heart and/or blood vessels (e.g. arteries). It is most commonly associated with atherosclerosis, a process in which fatty deposits "plaques" form in the arteries, narrowing and possibly completely blocking them. When atherosclerosis affects the main arteries in the body, it can cause a heart attack, stroke, or peripheral arterial disease. By knowing the warning signs and symptoms and seeking medical attention promptly, a person may be able to avoid or reduce the severity of a severe decrease in the blood supply to the heart (heart attack), brain (stroke), or hands and feet (peripheral arterial disease) (Levine, 2016).

2.1.2.2 Causes of Cardiovascular Events:

There are many causes for cardiovascular events such as arrhythmias, heart valve disease, cardiomyopathy (enlarged heart), certain types of cancers (malignancies), and drugs that are used to treat them, may cause blood

clots, or thrombosis, in the legs, heart, or in lungs (Liu, Li, Cao, Sun, Chen & Zhang, 2014).

Liu et al. (2014) also added that carotid or coronary artery disease, chest pain that starts in the chest and spread to the throat, jaw, shoulder blades, or arms (left or right), may be a sign of a coronary event. In addition to the experience of the feeling of chest heaviness, or tightness, nausea, sweating, or dizziness associated with the chest pain. It may also cause the feel of short of breath.

2.1.2.3 Risk Factors of Cardiovascular Disease

There are many risk factors linked to cardiovascular disease. Many of these can be addressed by adopting a healthy lifestyle.

- Smoking
- Male gender
- Diabetes.
- High blood cholesterol
- High blood pressure
- Kidney disease
- Physical inactivity
- Excess weight
- Unhealthy eating
- Increasing age
- High resting heart rate
- Depression and stress
- Family history of heart disease or stroke (Mavrakanas & Charytan, 2016).

2.1.3 End-Stage Renal Disease (ESRD)

2.1.3.1 Definition of End-Stage Renal Disease (ESRD)

Chronic kidney failure, or end-stage renal disease (ESRD), is a gradual and irreversible deterioration in kidney function in which the body's ability to maintain a balance of metabolism and fluids and electrolytes balance fails,

resulting in uremia or azotemia (retention of urea and other nitrogenous wastes in the blood). ESRD may be caused by systemic diseases, such as diabetes mellitus (the main cause); hypertension; chronic glomerulonephritis; pyelonephritis (inflammation of the renal pelvis); obstruction of the urinary tract; hereditary lesions, as in polycystic kidney disease; vascular disorders; infections; medications; or toxic agents. Comorbid conditions that develop during chronic renal failure contribute to the high morbidity and mortality among patients with ESRD (Brunner & Suddarth, 2006). Figure (2) below shows the difference between normal kidney and deceased kidney.

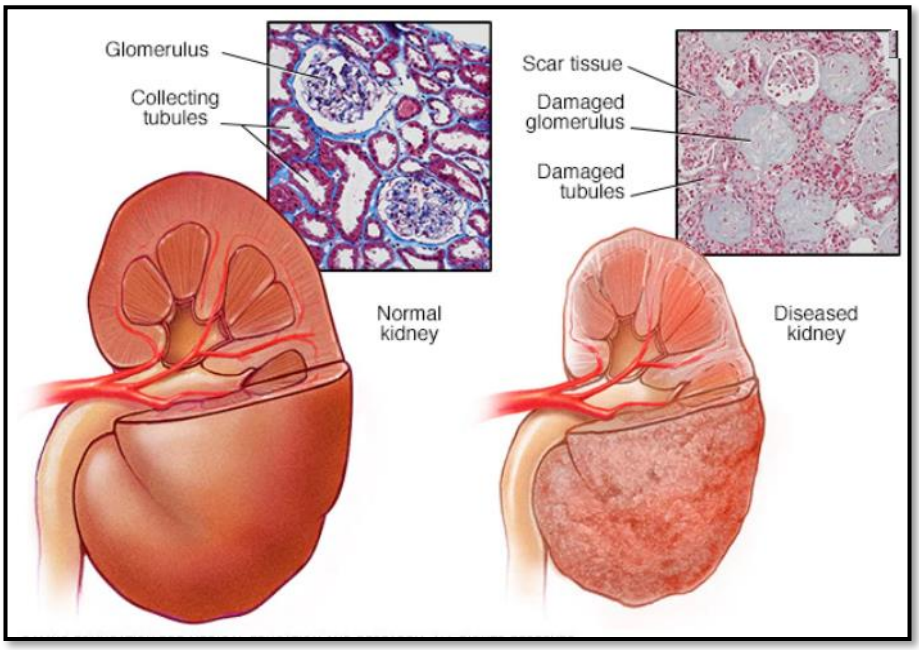


Figure (2): The difference between normal kidney and deceased kidney

(Source: Brunner & Suddarth, 2006)

2.1.3.2 Causes of ESRD

Many kidney diseases attack the nephrons, the tiny filtering units in the kidneys. This leads to poor blood filtering, which eventually leads to ESRD. ESRD is caused most commonly by diabetes and hypertension (high blood pressure).

Other causes of ESRD include (Liao, Lin, Tsai, Hsu & Wuet, 2018):

- Long-term blockage of the urinary tract by kidney stones enlarged prostate or certain types of cancer.
- Glomerulonephritis, an inflammation of the filters in the kidney (known as glomeruli).

2.1.3.3 Risk factors for ESRD

Risk factors for ESRD include (Abbasi & et al, 2010):

- Older age people; hypertension and diabetes mellitus patients; people with obesity; history of renal disease; and tobacco, heroin, or analgesic use.
- End-Stage Renal Disease “ESRD” leads to fluid retention, anemia, disturbances of bone and mineral metabolism, and increased risk of cardiovascular disease (CVD). Increasing the dose of peritoneal dialysis does not seem to reduce mortality. In people receiving hemodialysis, there is no difference in mortality for high flux hemodialysis compared with low flux hemodialysis, or increased-dose compared with standard-dose hemodialysis. Erythropoietin and darbepoetin may help maintain hemoglobin levels in persons with ESRD, although normalizing hemoglobin levels in persons with both ESRD and CVD may increase mortality. Disorders of calcium and phosphate metabolism may contribute to the increased risk of CVD in persons with ESRD.
- Phosphate binders (sevelamer) may slow arterial calcification and reduce serum low-density lipoprotein cholesterol levels, but we do not know whether this reduces cardiovascular events or mortality.

- Cinacalcet is more effective than placebo at improving control of secondary hyperparathyroidism, but we do not know (National Institutes of Health, 2011).

2.2 Related Studies

In Romania in 2020 (Tudoran, Ciocarlie, Mates, Pescariu, Abu-Awwad & Tudoran) prepared a study aimed to assess pulmonary vascular resistance (PVR), AVF flow volume (AVF-FV) and cardiac output (CO) and to highlight the impact of their augmentation, as well as of the duration of undergoing hemodialysis (HD), on the occurrence of pulmonary hypertension (PH) in patients with ESRD. This study consisted of 51 dialyzed patients, with ESRD, without a history of PH, were determined by ultrasonography the systolic pulmonary arterial pressure (PAPs), the left ventricular ejection fraction (EF), the cardiac output (CO), PVR and AVF-FV. The study findings revealed that all patients had elevated PVR, higher AVF-FV and CO comparing to patients without PH. They were undergoing HD for a longer period and had lower EF than those without PH. For all patients, there were strong correlations between PAPs and PVR and the duration of HD, but moderate ones with AVF-FV and CO. The study concluded that in patients with ESRD undergoing HD, PH was a common finding being associated with increased PVR, a longer duration of HD and chronic glomerulonephritis as etiology for ESRD. The majority of patients with PH had altered left ventricular systolic function, predisposing them to an increased risk to develop heart failure. Another study prepared by (Liao et al., 2018) about "**Renal transplantation delays major adverse cardiac events (MACEs) in patients with end-stage renal disease: A nationwide population-based study**". The study aimed to examine if a renal transplantation (RT) affects the risk of cardiovascular events. This nationwide population-based study investigated the risk of major adverse

cardiac events (MACEs) and stroke after RT in patients with end-stage renal disease (ESRD), using data obtained from the National Health Insurance Research Database in Taiwan. A sample of 164 (ESRD) patients who underwent (RT) formed the study cohort, and an age- and sex-matched control group comprised 164 patients without (RT) selected from 6976 ESRD patients. The study findings concluded that renal transplantation (RT) seemed not to reduce the risk of major adverse cardiac events (MACEs) directly, but it could have dramatically delayed (MACEs) and stroke episodes in the (ESRD) patients. Furthermore, a lower mortality rate was observed in the (ESRD) patients who received renal transplantation compared to those undergoing chronic dialysis.

Miglioranza, Picano, Badano, Sant'Anna, Rover, Zaffaroni, Sicari, Kalil, Leiria & Gargani (2017) prepared a study in Italy about "**Pulmonary congestion evaluated by lung ultrasound predicts decompensation in heart failure outpatients**", the study objective to determine the prognostic value of LUS in predicting adverse events in heart failure outpatients. A sample of (97) moderate-to-severe systolic heart failure HF patients. Lung ultrasound predicts LUS evaluation was performed during the regular outpatient visit to evaluate the presence of pulmonary congestion, determined by B-lines number. Patients were followed up for 4 months to assess admission due to acute pulmonary edema. The study results suggested that pulmonary congestion is the main cause of hospital admissions among heart failure patients. Lung ultrasound can be used as a reliable and easy way to evaluate pulmonary congestion through assessment of B-lines.

Another study conducted in Japan by (Aoki & Ikari, 2017), entitled "**CVD in Patients with ESRD on Hemodialysis**", the study followed that systematic method, the different studies showed deteriorated clinical

outcomes after coronary revascularization, which were dependent on the harshness of renal dysfunction. Patients with ESRD (end-stage renal disease) who undergo dialysis also have the most severe renal dysfunction. The study results showed that the medications for primary or secondary cardiovascular prevention are also inadequate in ESRD patients. The efficacy of drug-eluting stents is lower in ESRD patients, compared to the excellent outcomes observed in patients with normal renal function. Unsatisfactory outcomes with trials targeting CVD in patients with ESRD confirm a large potential to improve outcomes. Therefore, optimal strategies for diagnosis, prevention, and management of cardiovascular disease in ESRD patients must be modified.

Whereas, (Rutherford & Mark, 2017) prepared a study aimed to investigate that CVD is popular in patients with chronic kidney disease (CKD). This is due to both traditional and novel vascular risk factors. The risk of sudden death from heart disease or arrhythmia is greatly exaggerated in CKD, especially in patients with ESRD where the risk is about 20 times that of the general population. The reasons for this increased risk are not fully understood, and while atherosclerosis is accelerated in the presence of (CKD), early myocardial infarction not only explains the increased risk. The study also concluded that the structure and function of the heart begins to change early in (CKD), independent of other risk factors. The implications of cardiac remodeling and hypertrophy may affect chronic kidney disease patients to heart failure, arrhythmia and myocardial ischemia.

A study about "**Pulmonary Function in Patients with End-Stage Renal Disease: Effects of Hemodialysis and Fluid Overload**" was carried out by (Yilmaz et al, 2016) in Turkey. This study objective was to investigate acute effects of hemodialysis treatment on spirometry parameters, focusing

on the relationship between pulmonary function and fluid status in hemodialysis patients. A sample of (54) hemodialysis patients were participated in the study. A Multi-frequency bio-impedance analysis (BIA) was used to assess fluid status before and 30 min after the midweek of hemodialysis (HD). Over- hydration (OH)/extracellular water (ECW) % ratio was used as an indicator of fluid status. The study findings showed that forced vital capacity (FVC), FVC%, and forced expiratory volume in the first second (FEV1) levels were significantly increased after hemodialysis. The results also concluded that fluid overload is closely associated with restrictive and obstructive respiratory abnormalities in HD patients. In addition, hemodialysis has a beneficial effect on pulmonary function tests, which may be due to reduction of volume overload.

In 2016 in New York (Bhatti, Galougahi, Nazif, Moses, Stone & Karmpaliotis) conducted a study to about "**Diagnosis and Management of Cardiovascular Disease in Advanced and End-Stage Renal Disease**". The study concluded that cardiovascular disease processes are highly prevalent and have major negative impacts on clinical outcomes in patients with advanced chronic kidney disease (CKD). Nevertheless, optimal cardiovascular management in this population remains challenging due to the absence of data from randomized clinical trials, from which this high-risk group continues to be excluded. Encouraging data on the improvement of cardiovascular outcomes after successful renal transplantation with appropriate cardiovascular workup and management highlights the urgent need for clinical trials to investigate a wide array of unresolved clinical issues related to cardiovascular pathologies in advanced CKD.

Furthermore, Subbiah, Chhabra & Mahajan (2016) prepared a study in India about "**cardiovascular disease in patients suffer from chronic kidney disease**", the aim of this systematic review was to investigate the

prevalence of cardiovascular disease in patients with (CKD). About (50) studies were reviewed in this study, the findings showed that CKD is an independent risk factor for CVD and majority of patients expire due to CVD than progress to ESRD. This risk worsens as the severity of renal dysfunction worsens. Identification of patients with early CKD is crucial as prevention works better than cure. Apart from the traditional risk factors, novel risk factors peculiar to CKD results in early and rapid progression of CVD.

Cardio-Pulmonary-Renal Interactions a study prepared in Germany by (Syed, McCullough, Birk, Renker, Brocca, Seeger & Ronco (2015), researchers have summarized current concepts in the pathogenesis of cardio-pulmonary-renal interactions CPRI including abnormalities, cardiopulmonary and systemic hemodynamics, neurohormonal activation, abnormal cell signaling, and tissue fibrosis. A sustained injury to the alveolar-capillary barrier can initiate lung structural and vascular remodeling, leading to chronic lung disease and pulmonary hypertension. Cardiac injury represents the origin of cascading deleterious events that may lead to myocardial remodeling with fibrosis and heart failure. Acute kidney injury might occur as a result of abnormal immune cell signaling of the injured tubular epithelial cells, whereas recurrent Acute kidney injury (AKI) leads to an elevated risk for subsequent CKD development.

In 2014, in Romania (Gluhovschi et al.) prepared a systematic review entitled "**Aspects of Renal-Pulmonary Pathogenic Relationships in Chronic Kidney Disease and Chronic Pulmonary Diseases**", its purpose was to analyze the main situations of the alteration of the kidney-lung relationship in clinical pathology, with special reference to chronic kidney disease. The researchers searched PubMed, CINAHL and Cochrane library databases between 2010 and 2014 for articles about Renal-Pulmonary

Pathogenic Relationships in Chronic Kidney Disease. The study findings showed that the pulmonary-renal syndrome was at the forefront, it is very important to know heart-kidney relationships via the lung in pulmonary arterial hypertension. In-depth knowledge of the patient with chronic kidney disease also requires thorough analysis of the lung-kidney relationship. This relationship is very evident in hemodialysis patients, taking into consideration that the pulmonary circulation is influenced by the dialysis membranes, in patients on peritoneal dialysis and especially in transplanted patients whose kidney-lung relationship has a favorable outcome.

Zoccali, Postorino, Tripepi, Tripepi & D'Arrigo (2013) also conducted a study in Italy about "**Pulmonary Congestion Predicts Cardiac Events and Mortality in ESRD**", the study aimed to test the prognostic value of extravascular lung water, a sample of (392) hemodialysis patients were measured in the study, and validated with ultrasound B-lines score (BLUS) in a multicenter. The study outcomes showed that there was moderate-to-severe lung congestion in 45% and very severe congestion in 14% of the patients. The study also concluded that the lung ultrasound can detect asymptomatic pulmonary congestion in hemodialysis patients, and the resulting BL-US score is a strong, independent predictor of death and cardiac events in the population.

Another study conducted by (Zoccali et al., 2013) about "**Lung Congestion as a Risk Factor in End-Stage Renal Disease**". This study findings showed that chest ultrasound (US), a novel, easyto- perform, cheap technique, which is currently applied for objective monitoring of pulmonary congestion in patients with heart failure in Europe, allows reliable quantification of lung water in clinical practice. Before hemodialysis (HD), about 60% of ESRD patients displayed moderate-

severe lung congestion and this alteration is frequently asymptomatic. Lung congestion is reduced but not abolished by ultrafiltration dialysis, and about one third to one-fourth of patients still have excessive lung water after dialysis. Lung congestion is also prevalent in patients on peritoneal dialysis (PD), and in apparently asymptomatic HD and PD patients this alteration is strongly associated with poor physical performance. Lung water in HD patients correlates in an inverse fashion with echocardiographic parameters of systolic and diastolic function, but it is only weakly related with hydration status measured by bioimpedance analysis. Moderate-severe lung congestion is a strong predictor of death and cardiovascular events and provides prognostic information independent of NYHA class, and traditional and nontraditional risk factors in ESRD patients on HD.

In Reggio Calabria in 2013 (Enia, Torino, Panuccio, Tripepi, Aliotta, Bellantoni, Tripepi et al) carried out a study titled "**Asymptomatic Pulmonary Congestion and Physical Functioning in Hemodialysis Patients**", the study aimed to examined the relationship between the physical functioning scale of the Kidney Disease Quality of Life Short Form and a validated ultrasonographic measure of lung water in a multicenter survey of 270 hemodialysis patients studied between 2009 and 2010. The outcomes showed that moderate to severe lung congestion by lung ultrasonography was observed in 156 (58%) patients; among these, 60 (38%) were asymptomatic (New York Heart Association [NYHA] class I), the study also concluded that symptomatic and asymptomatic lung congestion is associated with poor physical functioning in hemodialysis patients. This association is independent of NYHA.

Another study conducted by (Wang, Lam, Chan, Lui & Sanderson, 2010) in Hong Kong, the study aimed to determine the role of echocardiography and the additional value of serum biomarkers in predicting sudden cardiac death. A prospective 5-year study was conducted in 230 patients with

(ESRD). During follow-up, 24 percent of all deaths are attributable to sudden cardiac death. In the multivariable Cox regression analysis considering clinical, biochemical, dialysis, and echocardiographic parameters, left ventricular systolic dysfunction emerged as the most important predictor of sudden cardiac death, followed by a high systolic and a low diastolic blood pressure. The study also concluded that an additional value in measuring cardiac troponin T in order to stratify the risk of sudden cardiac death. The N-terminal pro-brain natriuretic peptide can be used in place of echocardiography to identify patients at risk of sudden cardiac death but have no added value on echocardiography in predicting sudden cardiac death. The study showed that ESRD patients suffer from a higher rate of sudden cardiac death.

While (Seliger, Weiss, Cilen, Kestenbaum, Ball, Sherrard & Breen) prepared a study in 2001 in USA about "**HMG-CoA reductase inhibitors are associated with reduced mortality in ESRD patients**", this study aimed to determine whether the use of statins is associated with a reduction in cardiovascular-specific death and total mortality in ESRD patients. Data were analyzed from the U.S. Renal Data System Dialysis Morbidity and Mortality Wave, a cohort of randomly selected patients who were initiating dialysis in 1996. Information about the use of statins as well as other baseline characteristics was abstracted from the patients' dialysis records by dialysis personnel. Cox proportional hazards models were developed to determine the association between use of statins at baseline and subsequent risk of mortality, with adjustment for known mortality risk factors. The results concluded that Stalin use was independently associated with a reduced risk of total mortality relative risk (RR), confidence interval (CI) as well as cardiovascular- specific mortality. The study also showed that statin use was associated with a reduction in cardiovascular-specific death and total mortality in patients on dialysis.

Chapter Three

Methodology

This section deals with the main decisions taken with regard to research design research population, sample and analysis. Also, this section shows the various aspects of data collection methods and the instruments used to gather primary data in order to provide valid and reliable study.

3.1 Study Design

The design used prospective study design. The study involves taking a cohort of subjects and watching them over a long period.

3.2 Study Setting

This study was conducted in Palestine, at An-Najah National University Hospital in the cardiac surgery department. The An-Najah National University Hospital was established in 2013 in cooperation with the Faculty of Medicine and Health Sciences at An-Najah National University. The Hospital is considered one of Palestine's leading institutions in the field of health care. The Hospital is a non-profit organization and the only teaching hospital in Palestine that provides clinical education and training to future and current health professionals. With 120 beds, the Hospital includes a well-equipped intensive care unit, an emergency room, a dialysis unit, a radiology department (X-ray and ultrasound), and a CT scan. The Hospital offers different services for complex medical conditions which require cardiac care and eye surgery, including cornea transplant and artificial cornea transplant. The Hospital provides advanced liver surgery, general surgery, and orthopaedics. The Hospital also provides healthcare services for children including advanced spinal surgery, pediatric cancer,

and childhood diseases. It is also the hospital that contains the biggest dialysis department in Palestine, and other many departments.

3.3 Study Population

The research community consists of all the patients of the Department of artificial kidney at An-Najah National University Hospital (280) according to the information of the researcher who works in the hospital**.**

3.4 Study Sample Size

The sample includes all ESRD patients at An-Najah National Hospital, who met the inclusion and exclusion criteria.

3.5 Inclusion & exclusion Criteria

3.5.1 Inclusion Criteria

- All ESRD patients.
- On regular hemodialysis for more than one year.
- At frequency of 3 times/ week, at Najah National University Hospital who are willing to participate in the study.
- Above 18 years of age, not having any concomitant malignancy.
- And all the patients who meet the criteria mentioned above.

3.5.2 Exclusion Criteria

- Any patient not willing to participate in the study.
- Less than 18 years of age.
- Patients who have Peritoneal Dialysis (PD).

3.6 Selection of the Study Tools

The observation is used as the instrument to gather information from the target population for research study. The observation includes medical tests and medical file follow up to monitor the patient's health.

The study tools were contained several sections as follows:

1- Demographic data:

The researcher worked according to weight, age, cause of dialysis, period of dialysis, previous diseases, being a smoker or not, having previous operations or not.

2- Nursing Clinical Assessment:

These tools include (a)hearing lung sound by nursing process (auscultation) by using statoscopes, to distinguish between normal and abnormal lung sound, and normal and abnormal heart sound to assess any fluid overload whether the patient has symptoms or not. (b) biting edema palpation as a result of fluid retention and working according to its criteria:

1+	2mm depression, barely detectable. Immediate rebound.
2+	4mm deep pit. A few seconds to rebound.
3+	6mm deep pit. 10-12 seconds to rebound.
4+	8mm: very deep pit. >20 seconds to rebound.

(Hogan, 2007)

Total body water were estimated using the following classic formulas: (Watson, Watson & Batt, 2008)

For males:

Total Body Water (TBW)= 2.447- 0.09156×age

+0.1074×height+ 0.3362×weight

Water in Litres

Age in years

Height in cm

Weight in kg

For females:

TBW= -2.097+ 0.1069×height+ 0.2466×Weight

Water in Litres

Height in cm

Weight in kg.

3.7 Ethical Consideration

I was trained and prepared to collect information by specialized doctors and residents in the Artificial Kidney Department. I was tested and examined several times to see if I was able to collect information on my own. My education and training lasted for a whole year to start collecting information.

3.8 Data Collection Procedures

The study was at An-Najah National Hospital in the Artificial Kidney Department, and it was the mechanism/method of collecting information by taking information from the patient (interview), and from demographic information after obtaining consent from patients and from the institution.

Patients undergoing dialysis 3 times a week were examined, once at the beginning of the week and once at the end, in order to know whether fluids increased more at the beginning of the week than at the end of the week or there was no difference. The patients were examined without knowing anything about their condition. The patients were examined without knowing anything about the patient's condition (weight) and fluid intake, that is, before the dialysis session, so that the examiner would not expect anything in advance. The examination was by taking information about the patient from (weight, height, age, marital status, number of dialysis sessions per week, Job) and that was through the interview, and from reviewing the files after approval by the patients and the institution, of course.

A nursing clinical assessment, an auscultation, palpation, was used. An abnormal sound was heard from the lung and heart, and that was before the patient began the dialysis session, in order to confirm the sound and distinguish anything abnormal.

The biting edema scale was evaluated and used to assess the amount of improved fluid within the tissues that had not been completely withdrawn from the patient's body, and the fluid percentage was calculated through the equation:

For males:

Total Body Water (TBW)= 2.447- 0.09156×age

+0.1074×height+ 0.3362×weight

Water in Litres

Age in years

Height in cm

Weight in kg

For females:

TBW= -2.097+ 0.1069×height+ 0.2466×Weight

Water in Litres

Height in cm

Weight in kg.

Before and after the session in order to pass the amount of fluid withdrawn from the patient (uf) (amount Fluids that may be withdrawn during dialysis ("ultrafiltration").

My study was for patients, who met the conditions only, and it lasted for 6 months, and it was followed up by the doctors and residents in the department.

Chapter Four

Results

Introduction:

This chapter presents the results of this thesis, which was intended to answer whether some selected variables among hemodialysis patients can aid in predicting death.

The variables chosen by the researcher based on the opinion of the experts and specialists and the literature. These selected variables are: the patient's complaint, the number of admissions, weight, and body fluid percentage before and the number of washing and the difference between them.

Demographic and characteristics of hemodialysis participants:

One hundred and ninety-nine dialysis patients participated in this thesis, most of them were males (65.3%), non-working (82.4%), and non-smokers (72.9%), as the number of workers was only thirty-five and smokers fifty-four, with a ratio of 17.6% and 27.1% of the hemodialysis kidney failure participants, respectively.

As for the ages of the hemodialysis kidney failure participants, it was between twenty to eighty-six years, and despite this difference in age, most patients were over forty years old.

The weights of the participants varied between thirty-six kilograms to one hundred and sixteen kilograms and the averaged weight was seventy-six kilograms.

Most of the patients were suffering from anemia, as the average of their hemoglobin reached ten point six. However, there was a small proportion

of hemodialysis kidney failure participants had normal hemoglobin. For more details see table 1.

Table 1: Demographic Characteristics of the Participants (N= 199)

		Frequency	Percent
Gender	Male	130	65.3
	Female	69	34.7
Occupation	No	164	82.4
	Yes	35	17.6
Smoking	No	145	72.9
	Yes	54	27.1
Age categories	20-40 years	17	8.5
	40-60 years	94	47.2
	>60years	88	44.2
	Mean	**Std. D**	**Min-max**
Age	57.81	12.67	20-86
Dry Weight	73.63	16.00	36.50-116.0
Hb	10.64	1.22	5.7-14.2

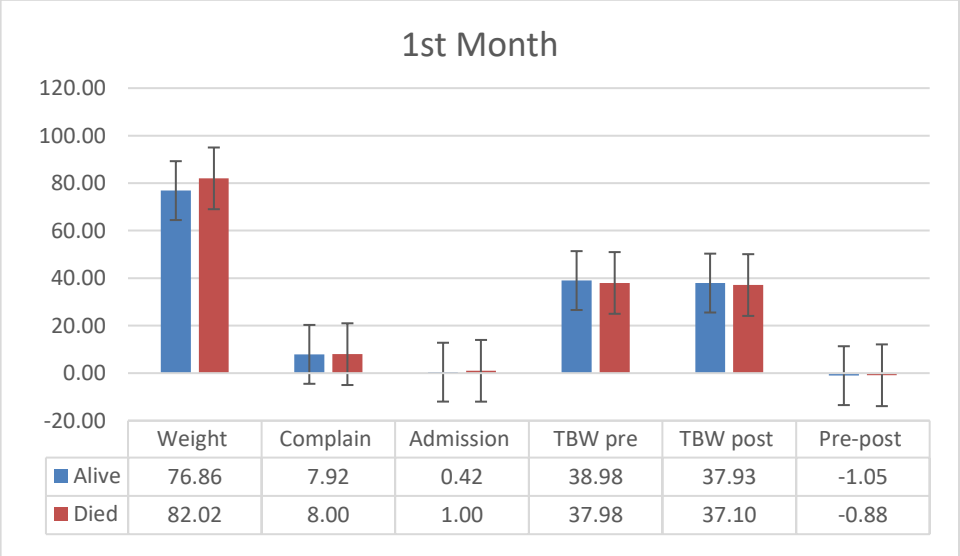
A comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during monthly follow-up:

Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during First follow up month:

When the hemodialysis kidney failure participants patients who died were compared with the rest of the hemodialysis kidney failure participants with regard to the differences in the chosen variables in this thesis, which are weight, disease complaint, percentage of hospital admissions, percentage of fluid in the body before and after hemodialysis and the difference between them, we did not find any statistically significant difference among these variables between the disease during the first follow up month of the study.

Although there were no statistically significant differences (*p* value > 0.05), the deceased patients had higher rates of weight (82), disease complaints (8), and hospital admissions (1) higher than the rest of the participants (76.8, 7.9, & 0.42 respectively).

On the other hand, the percentages of body fluids before (37.9) and after (37.1) dialysis were lower among the deceased participants compared to the rest of the patients participating in the study (38.9 &37.9, respectively). See figure 3



	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.86	7.92	0.42	38.98	37.93	-1.05
Died	82.02	8.00	1.00	37.98	37.10	-0.88

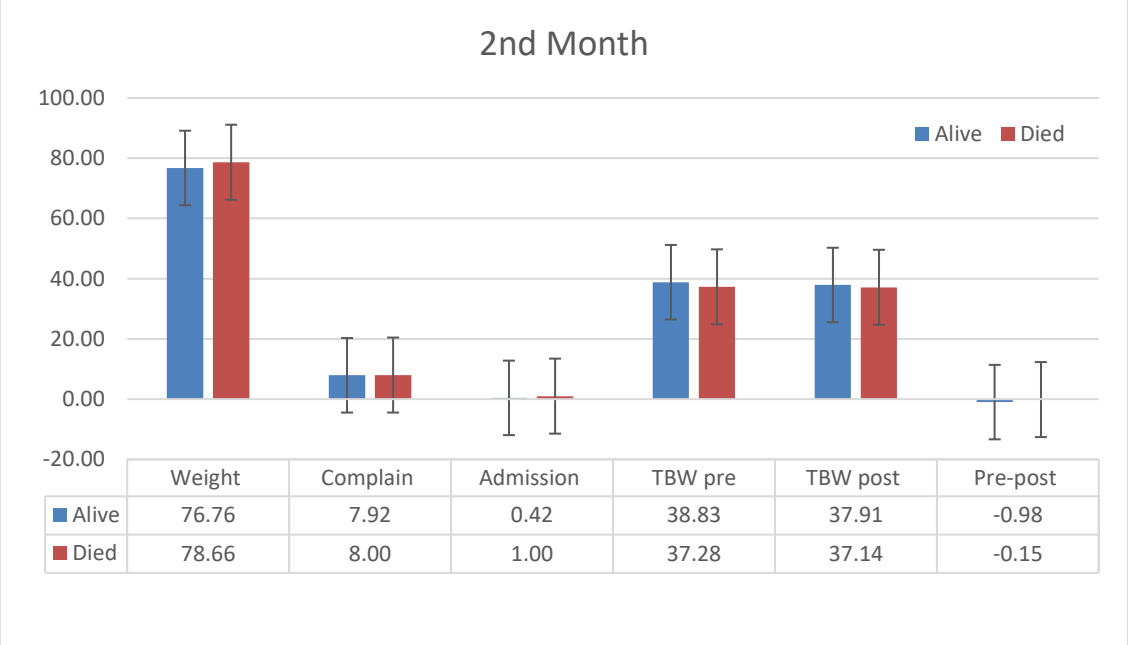
Figure 3: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 1st follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Second follow up month:

It is noticeable, and by looking at the results of the study during the follow-up in the second month, we notice that there are no statistically significant differences between the deceased patients and the rest of the patients

Although there were no statistically significant differences (*p* value > 0.05), the deceased patients had rates of weight (78.6), disease complaints (8),

and hospital admissions (1) higher than the rest of the participants (76.8, 7.9, & 0.42 respectively).

On the other hand, the percentages of body fluids before (37.9) and after (37.1) dialysis were lower among the deceased participants compared to the rest of the patients participating in the study (38.9 &37.9 respectively). See figure 4



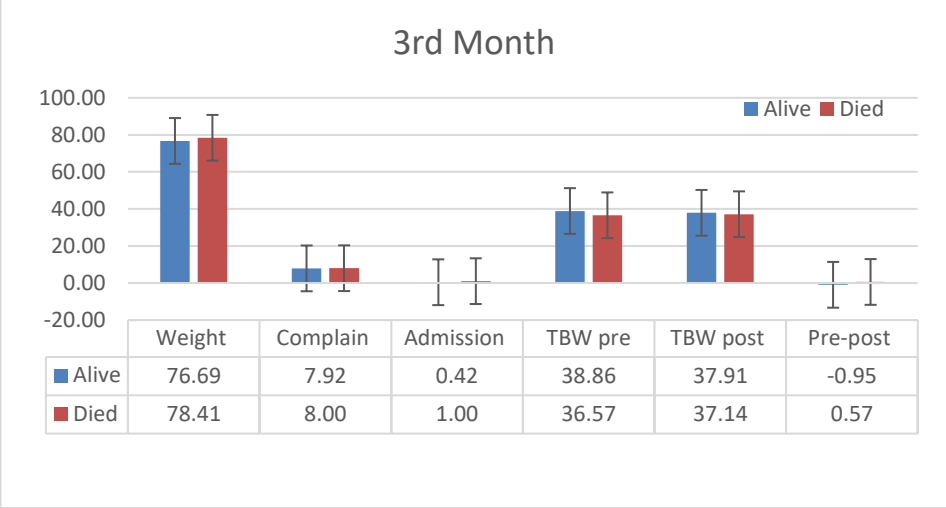
	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.76	7.92	0.42	38.83	37.91	-0.98
Died	78.66	8.00	1.00	37.28	37.14	-0.15

Figure 4: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 2nd follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Third follow up month:

The results of the study during the follow-up in the third month revealed that there are no statistically significant differences between the deceased patients and the rest of the patients regarding their selected variables.

Although there were no statistically significant differences (p value > 0.05), the deceased patients had rates of weight (78.4), disease complaints (8), and hospital admissions (1) higher than the rest of the participants (76.6, 7.9, & 0.42 respectively).

On the other hand, the percentages of body fluids before (36.5) and after (37.1) dialysis were lower among the deceased participants compared to the rest of the patients participating in the study (38.8 & 37.9 respectively). See figure 5



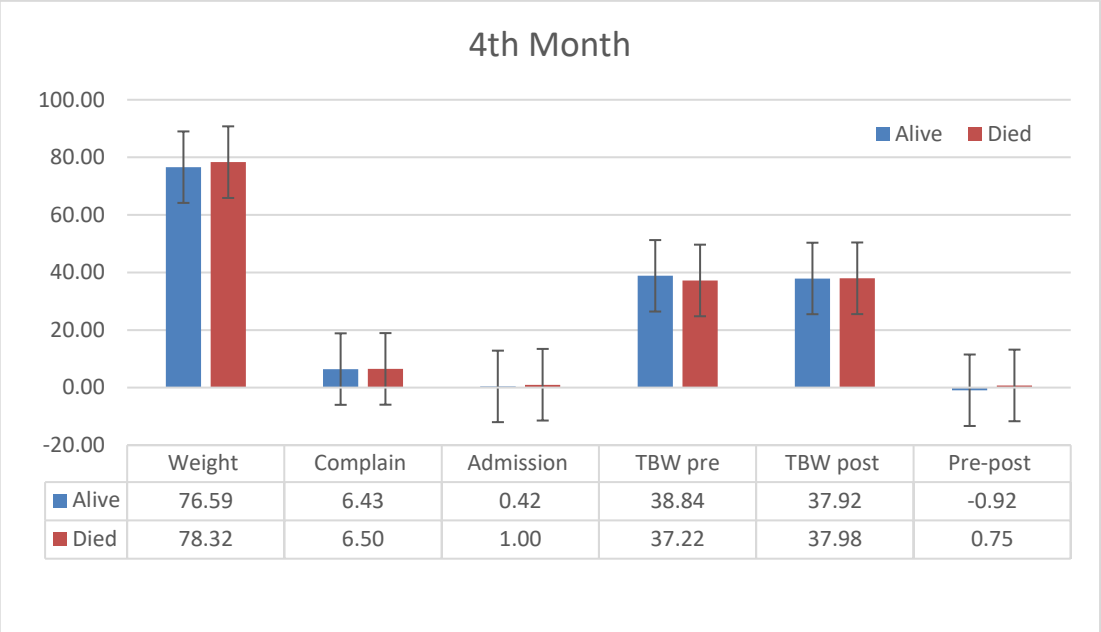
	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.69	7.92	0.42	38.86	37.91	-0.95
Died	78.41	8.00	1.00	36.57	37.14	0.57

Figure 5: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 3rd follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Fourth follow up month:

The results of the study during the follow-up in the fourth month revealed that there are no statistically significant differences between the deceased patients and the rest of the patients regarding their selected variables.

Although there were no statistically significant differences (*p* value > 0.05), the deceased patients had rates of weight (78.3), disease complaints (6.5), and hospital admissions (1) higher than the rest of the participants (76.5, 6.4, & 0.42 respectively).

On the other hand, the percentages of body fluids before (37.2) and after (37.9) dialysis were lower among the deceased participants compared to the rest of the patients participating in the study (38.8 & 37.9 respectively). See figure 6



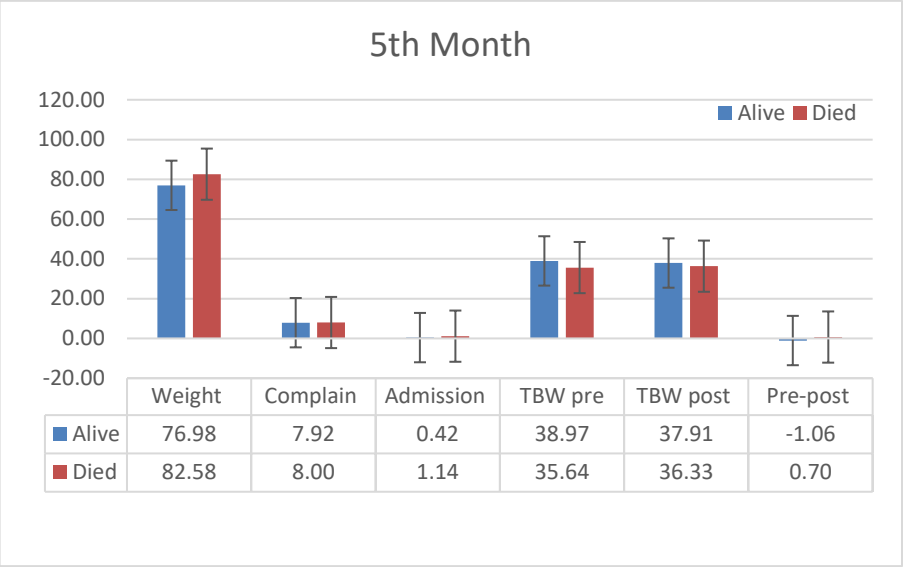
	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.59	6.43	0.42	38.84	37.92	-0.92
Died	78.32	6.50	1.00	37.22	37.98	0.75

Figure 6: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 4th follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during Fifth follow up month:

The results of the study during the follow-up in the fifth month revealed that there are no statistically significant differences between the deceased patients and the rest of the patients regarding their selected variables.

Although there were no statistically significant differences (*p* value > 0.05), the deceased patients had rates of weight (82.5), disease complaints (8), and hospital admissions (1.14) higher than the rest of the participants (76.9, 7.9, & 0.42 respectively).

On the other hand, the percentages of body fluids before (35.6) and after (36.3) dialysis were lower among the deceased participants compared to the rest of the patients participating in the study (38.9 & 37.9 respectively). See figure 7



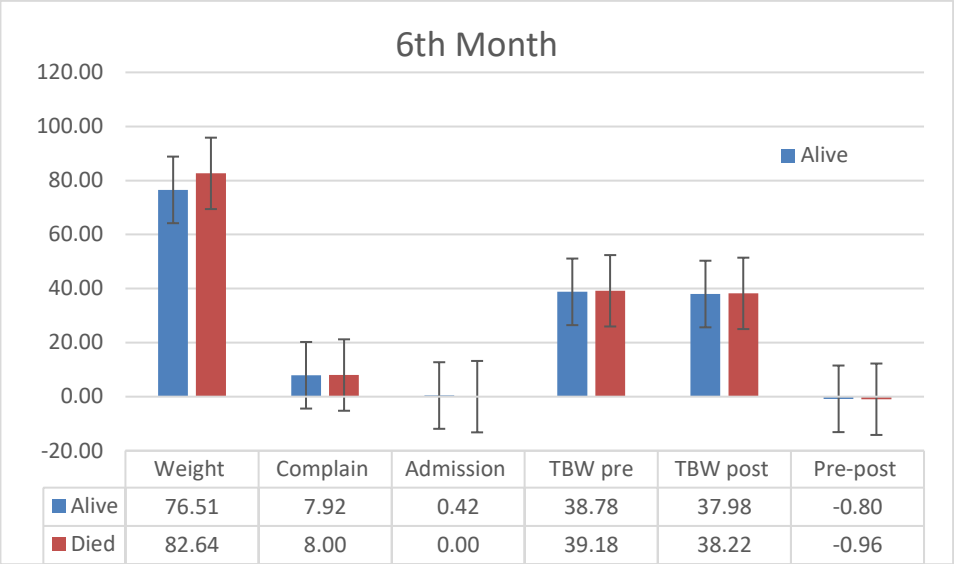
	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.98	7.92	0.42	38.97	37.91	-1.06
Died	82.58	8.00	1.14	35.64	36.33	0.70

Figure 7: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 5th follow up month Comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during the 6th follow up month:

The results of the study during the follow-up in the sixth month revealed that there are no statistically significant differences between the deceased patients and the rest of the patients regarding their selected variables.

Although there were no statistically significant differences (*p* value > 0.05), the deceased patients had rates of weight (82.6), disease complaints (8), and hospital admissions (0) higher than the rest of the participants (76.5, 7.9, & 0.42 respectively).

On the other hand, the percentages of body fluids before (39.1) and after (37.2) dialysis were higher among the deceased participants compared to the rest of the patients participating in the study (38.7 & 37.9 respectively). See figure 8

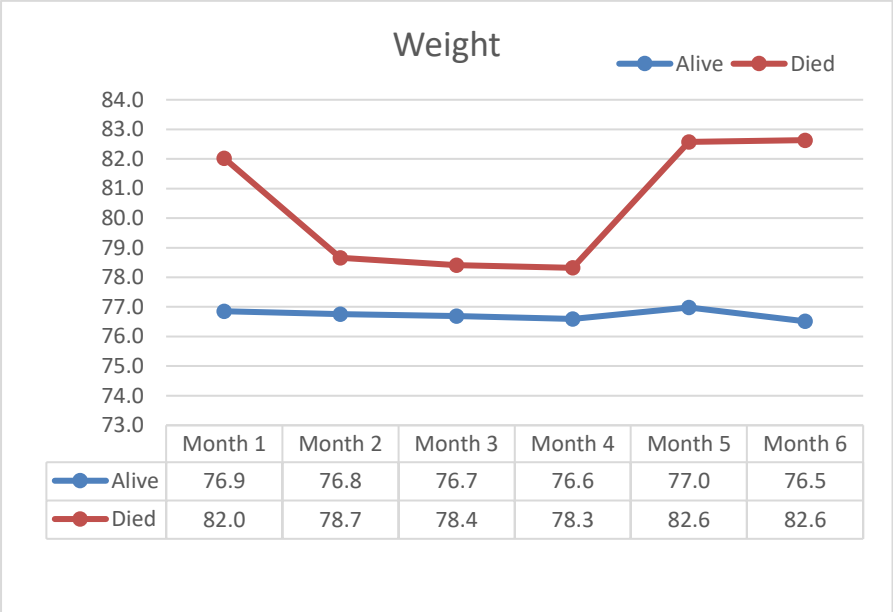


	Weight	Complain	Admission	TBW pre	TBW post	Pre-post
Alive	76.51	7.92	0.42	38.78	37.98	-0.80
Died	82.64	8.00	0.00	39.18	38.22	-0.96

Figure 8: Comparison between the deceased dialysis participants' patients and the rest of the participants during the 6th follow up month A comparison of selected study variables between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants weight during the six-month follow-up period:

The figure 7 clearly shows that the averages of weights of the deceased dialysis participants' patients were higher than the other participants' averages weights during the six-month follow-up period.

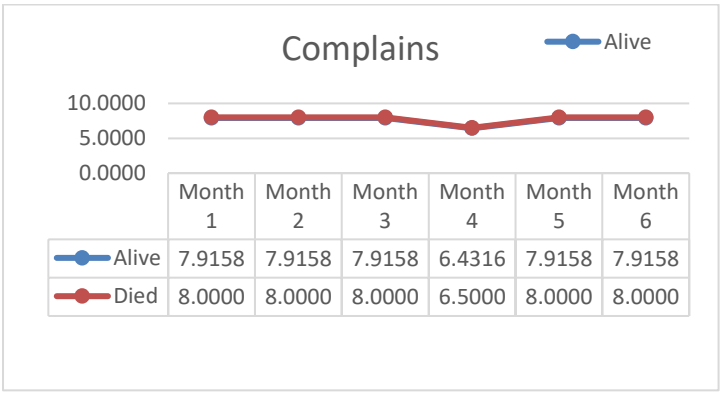
It is also noticed through the figure 7 that the averages of weights of the deceased dialysis participants' patients varied greatly from one month to the next during the six-month follow-up period compared to the other group, whose weights were relatively constant between months during the six-month follow-up period.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	76.9	76.8	76.7	76.6	77.0	76.5
Died	82.0	78.7	78.4	78.3	82.6	82.6

Figure 9: Weight comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants complain during the six-month follow-up period:

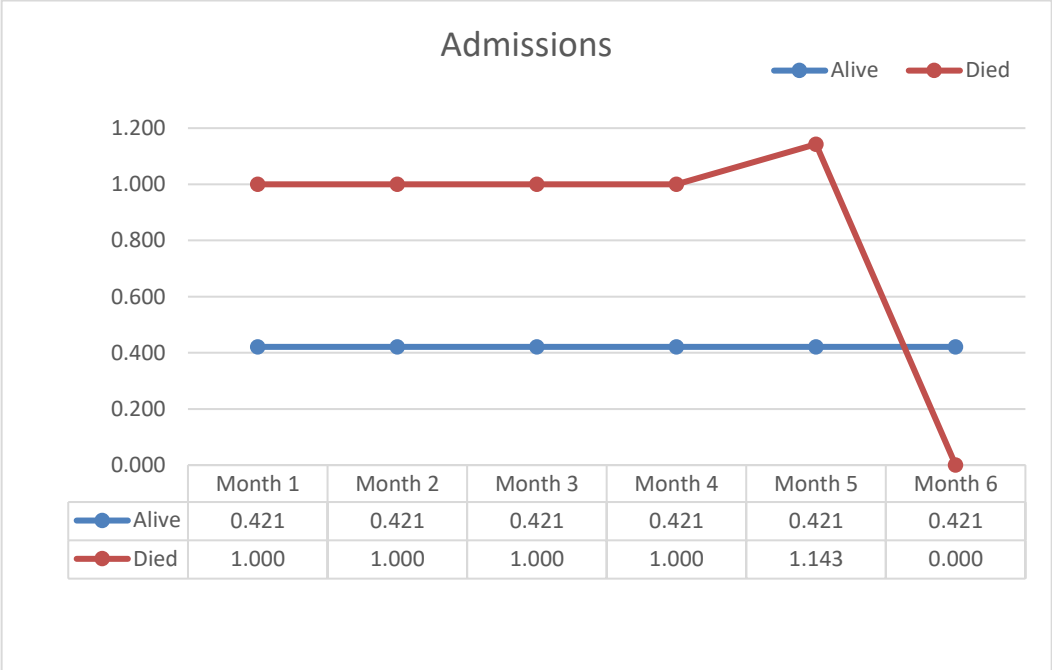
The figure 8 clearly shows that the averages of complains namely: *general wellbeing, insomnia and pruritus* of the deceased dialysis participants' patients were nearly the same as the other participants' averages complains during the six-month follow-up period.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	7.9158	7.9158	7.9158	6.4316	7.9158	7.9158
Died	8.0000	8.0000	8.0000	6.5000	8.0000	8.0000

Figure 10: Complains comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' admissions during the six-month follow-up period:

The figure 9 clearly shows that the averages of admission of the deceased dialysis participants' patients were higher than the other participants' averages admission during the first 4 month of six-month follow-up period. It is noticed from the figure 9 that the number of admissions began to gradually decrease among the deceased patients as the deaths were occurred after the fourth month, and thus this was reflected in the rate of admission between the deceased group compared to the rest of the patients whose admission rates to the hospital were almost constant.

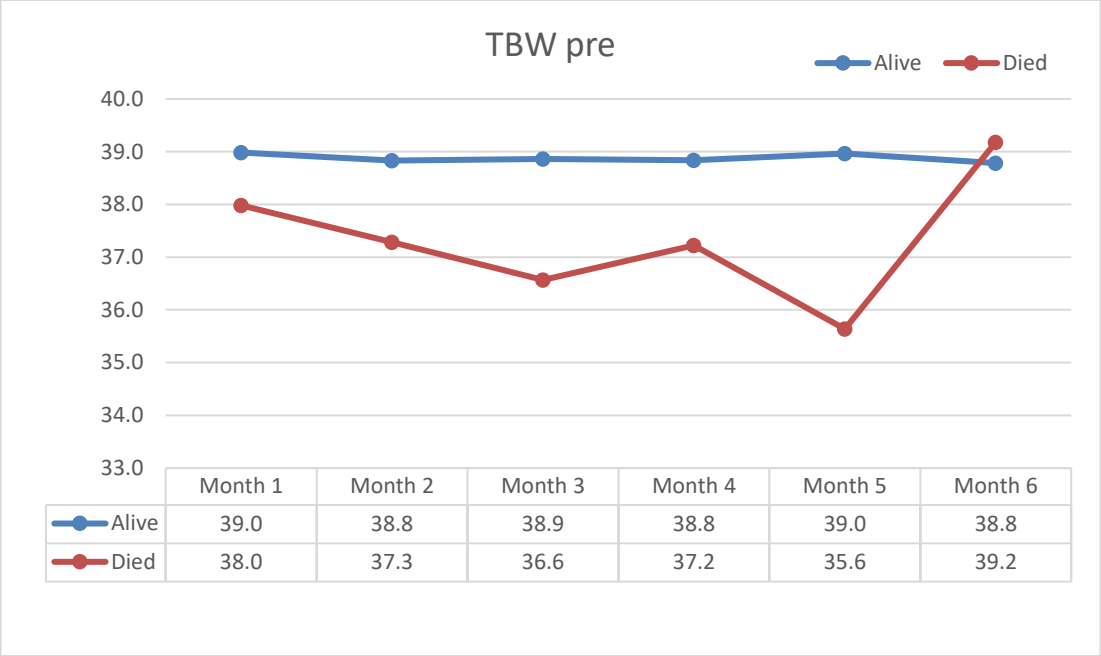


	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	0.421	0.421	0.421	0.421	0.421	0.421
Died	1.000	1.000	1.000	1.000	1.143	0.000

Figure 11: Admissions comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Pre TBW during the six-month follow-up period:

It is clear when referring to the results presented in Figure 10, the percentage of pre dialysis total body fluids was less in the deceased hemodialysis patients participating in the study, compared to the percentage pre dialysis total body fluids present in the rest of the dialysis patients participating in the study. Figure 10 revealed that the pre TBF

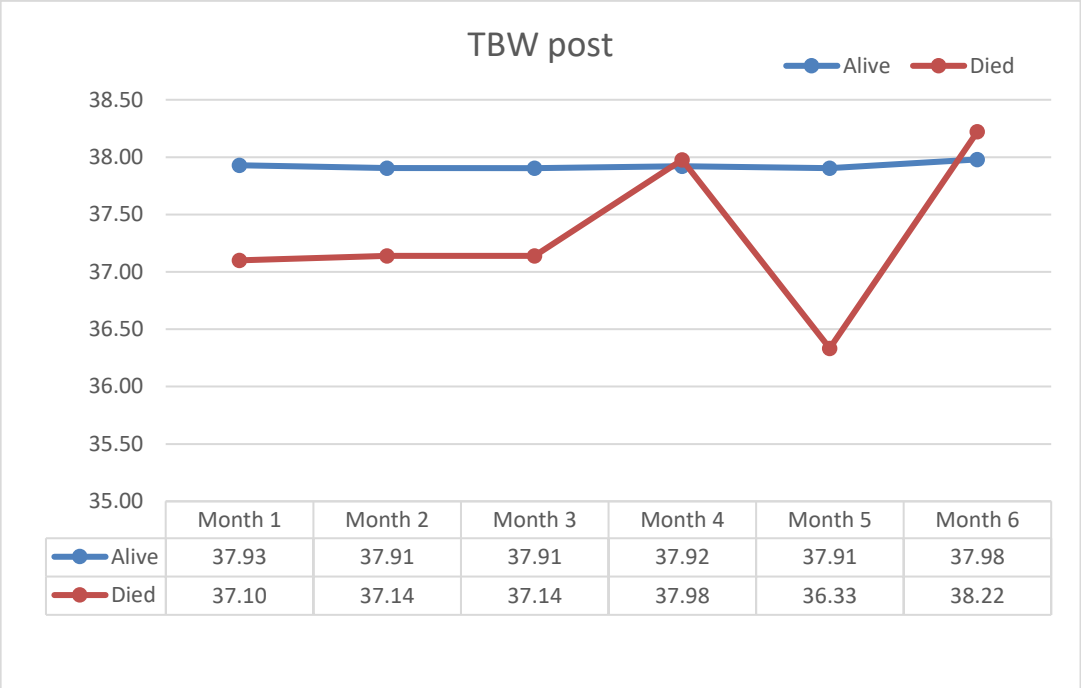
began to gradually increase among the deceased patients as the deaths were occurred after the fourth month.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	39.0	38.8	38.9	38.8	39.0	38.8
Died	38.0	37.3	36.6	37.2	35.6	39.2

Figure 12: Pre TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Post TBW during the six-month follow-up period:

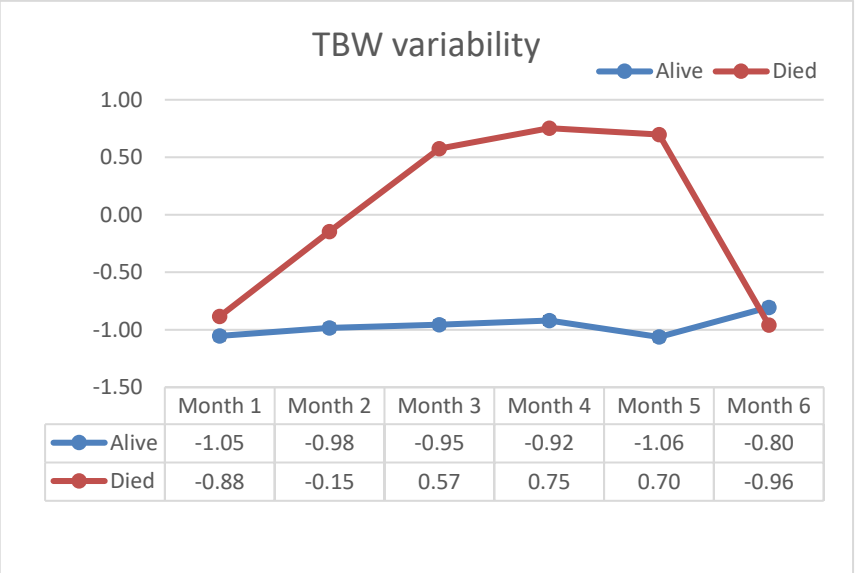
It is clear when referring to the results presented in Figure 11, the percentage of post dialysis total body fluids was less in the deceased hemodialysis patients participating in the study, compared to the percentage pre dialysis total body fluids present in the rest of the dialysis patients participating in the study. Figure 11 revealed that the post TBF began to gradually increase among the deceased patients as the deaths were occurred after the fourth month.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	37.93	37.91	37.91	37.92	37.91	37.98
Died	37.10	37.14	37.14	37.98	36.33	38.22

Figure 13: Post TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' Variability of TBW during the six-month follow-up period:

The twelfth figure clearly shows that the change in the percentage of total fluids in the body between before dialysis and after dialysis, the differences and variations were wider in the deceased patients compared with the rest of the kidney dialysis disease study participants, whose results reflected a relative stability of the differences between the percentage of total body fluids before and after dialysis.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Alive	-1.05	-0.98	-0.95	-0.92	-1.06	-0.80
Died	-0.88	-0.15	0.57	0.75	0.70	-0.96

Figure 14: Variability of TBW comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period, Hemodialysis participants' edema during the six-month follow-up period:

The figure 13 clearly shows that the averages of edema of the deceased dialysis participants' patients were lower than the other participants' averages of edema during the first 4 month of six-month follow-up period. It is noticed from the figure 13 that the edema began to gradually decrease among the deceased patients as the deaths were occurred after the fourth month, and thus this was reflected in the variation in edema among deceased group compared to the rest of the patients whose edema rates were almost constant.

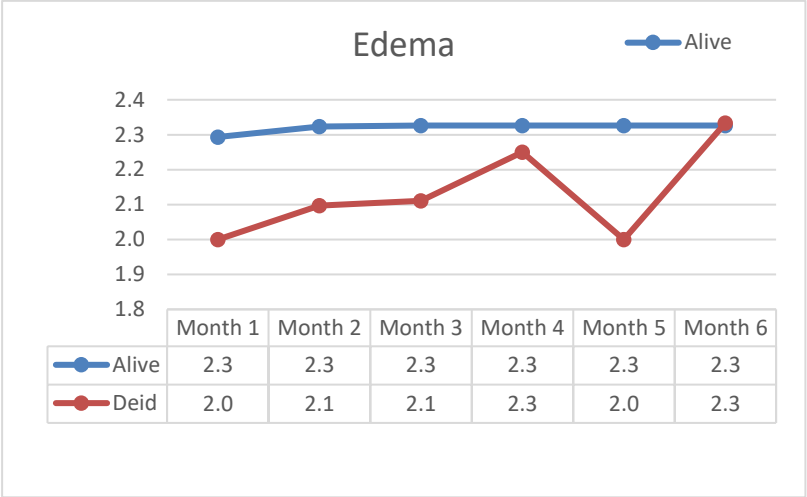


Figure 15: Edema comparison between the deceased dialysis participants' patients and the rest of the participants during the six-month follow-up period

The areas under receiver operating curves discrimination (area under the ROC curve; 95% CI): Weight (0.55; 0.26–0.83), Complain (0.50; 0.27–0.73), Admission (0.47; 0.25–0.69), Pre TBW (0.51; 0.25–0.76) and Post TBW (0.50; 0.25–0.75) Pre Post variation in TBW (0.54; 0.27–0.81) in prediction of hospital mortality outcomes.

Although all selected variables in the present thesis had low discriminative power, weight and variations in pre post TBW showed the highest discriminative power, followed by pre and post TBW. Admission showed lower discriminative power in prediction of hospital mortality outcomes comparing with variables as seen in figure 14 and table 2.

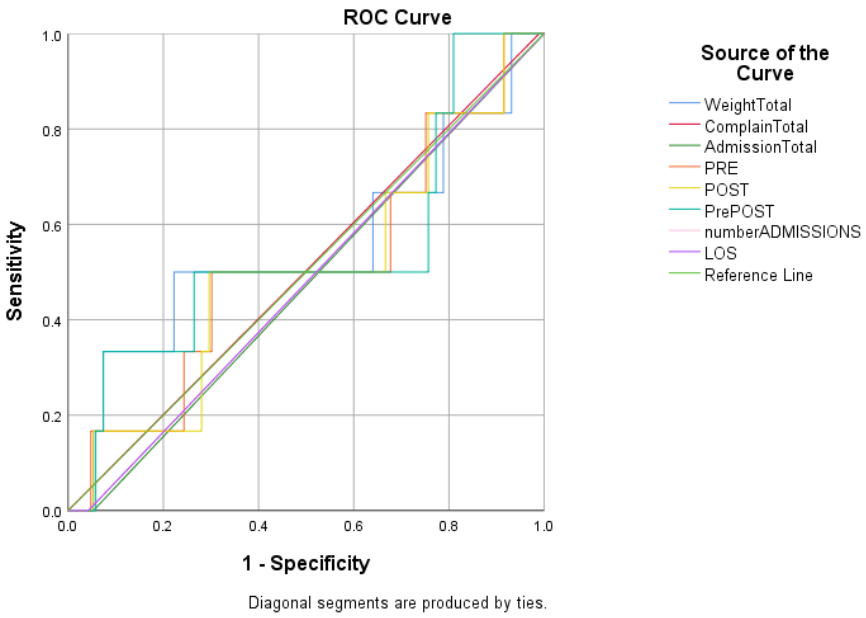


Figure 16: values for selected variables in prediction of hospital mortality outcome groups

Table 2: Area Under the Curve (AUC) values for selected variables to predict mortality.

Test Result Variable(s)	Area	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Weight	.549	.686	.266	.831
Complain	.504	.974	.271	.737
Admission	.474	.826	.250	.697
Pre TBW	.511	.930	.259	.762
Post TBW	.505	.965	.258	.753
Pre Post variation in TBW	.544	.713	.276	.812
Admissions	.479	.860	.253	.705
Length of Stay	.479	.860	.253	.705

Chapter Five

Discussion

The aim of this prospective, cohort study was to assess the effectiveness of the nursing clinical assessment and fluid status of the patients undergoing hemodialysis in predicting cardiac and pulmonary events among patients who undergo regular hemodialysis at Najah National university hospital.

The hemodialysis unit at Najah National university hospital is is the only unit providing peritoneal dialysis therapy and the number of hemodialysis patients in this unit represents about 20% of all hemodialysis patients in the West Bank, Palestine. So, the demographic, clinical and biochemical characteristics of included hemodialysis patients are likely to be generalizable to hemodialysis population in Palestine.

This study showed that the patients who have died have higher averages of body weight, complaints, and episodes of hospitalizations than their counterparts in the unit during the 6-month study period. However, the total body water (both before and after dialysis) as well as the difference between pre-and post-total body water were lower among the died patients although none of the findings were statistically significant.

The increased weight among the died category of patients might be explained in many directions. According to the CDC, The Centers for Disease control and prevention, BMI of 18.5-24.99 Kg/m2 is considered as normal weight. BMI of 25-29.99 Kg/m2 is considered over-weight and BMI of 30 Kg/m2 or more is defined as obesity. Extreme or severe obesity is considered if the body mass index is more than 40 Kg/m^2. *(https://www.cdc.gov/obesity/adult/defining.html)*.

Although obesity is considered an important risk factor for many of the chronic diseases including chronic kidney disease, cardiovascular diseases and even increased mortality rates among the general population, *(Chertow, G.M., Hsu, C.Y. and Johansen, K.L., 2006. The enlarging body of evidence: obesity and chronic kidney disease),* the paradoxical relationship between obesity and mortality among severely ill patients such as patients on dialysis, those with pulmonary or heart diseases *have* been reported in the literature, a term referred to as "Obesity Paradox" or "reverse epidemiology". (*Gunen H, Hacievliyagil SS, Kosar F et al. Factors affecting survival of hospitalised patients with COPD. Eur Respir J 2005; 26: 234–241*), *(Lavie CJ, Milani RV, Ventura HO. Obesity and cardiovascular disease: risk factor, paradox, and impact of weight loss. J Am Coll Cardiol 2009; 53: 1925–1932*). This phenomenon states that obesity might have a protective effect and is associated with better survival. Protein-energy wasting is another phenomenon in hemodialysis patients and is considered a risk factor for poor outcomes in terms of hospitalizations and mortality rates. Many epidemiological studies have indicated the inverse relationship between many classical risk factors of cardiovascular diseases and death in end stage renal disease patients on regular dialysis, namely, Body mass index, blood pressure and serum concentration of cholesterol as higher values of these variables was associated with better survival rates. This reflects the strong effect-modifying impact of protein-energy wasting in this category of paitents *(Kalantar-Zadeh, K., Kopple, J.D., Kilpatrick, R.D., McAllister, C.J., Shinaberger, C.S., Gjertson, D.W. and Greenland, S., 2005. Association of morbid obesity and weight change over time with cardiovascular survival in hemodialysis population. American journal of kidney diseases, 46(3), pp.489-500.).* This phenomenon is particularly strong among end stage

renal disease patients on regular dialysis in contrast to the general population. (*Kalantar-Zadeh, K., Block, G., Humphreys, M.H. and Kopple, J.D., 2003. Reverse epidemiology of cardiovascular risk factors in maintenance dialysis patients. Kidney international, 63(3), pp.793-808), (Park J, Ahmadi SF, Streja E et al. Obesity paradox in end-stage kidney disease patients. Prog Cardiovasc Dis 2014; 56: 415–425)* Obesity Paradox has also led to increased confusion among nephrologists considering if they should treat obesity in dialysis patients or not (*Vareldzis, R., Naljayan, M. and Reisin, E., 2018. The incidence and pathophysiology of the obesity paradox: should peritoneal dialysis and kidney transplant be offered to patients with obesity and end-stage renal disease?. Current hypertension reports, 20(10), p.84*.)

With regard to the patients on hemodialysis, there has been found that there is an inverse relationship between the BMI and the risk of death which has been proved by many previous studies as the higher baseline Body mass index BMI is associated with better outcomes. This was especially encountered for those BMI in the lower 50^{th} percentile. (*Kopple, J.D., Zhu, X., Lew, N.L. and Lowrie, E.G., 1999. Body weight-for-height relationships predict mortality in maintenance hemodialysis patients. Kidney international, 56(3), pp.1136-1148.)*

One explanation for this phenomenon, patients on hemodialysis with lower Body mass indices, have higher risk to have life-threatening chronic diseases that give rise to malnutrition by catabolic stimuli and anorexia. In the current situation, the death cause may be independent of poor nutrition. Such catabolic illness might lead to a decrease in body mass and, moreover, may lead to depletion of many other biologically precious components. Certain cytokines may stimulate the process of atherosclerosis

of the intimal layer and proliferation of intimal cells in the coronaries and many other blood vessels eventually leading to myocardial infarction or other vascular events. Another possible explanation is that patients on regular hemodialysis with low body mass index tolerate uremia and chronic kidney disease less well compared with their counterparts with higher BMI and this could be due to a another much severe form of poly-endocrinopathy that accompanies chronic kidney disease or even increased sensitivity to uremic toxins. (*Kopple, J.D., Zhu, X., Lew, N.L. and Lowrie, E.G., 1999. Body weight-for-height relationships predict mortality in maintenance hemodialysis patients. Kidney international, 56(3), pp.1136-1148.)*

Change in weight over the time is also considered a strong indicator for survival among hemodialysis patients as proved by many observational studies. These studies showed that increased weight in the first six months after initiating dialysis was associated with better outcomes and better survival and vice versa, weight loss is related with increased death risk. (*Chang, T.I., Ngo, V., Streja, E., Chou, J.A., Tortorici, A.R., Kim, T.H., Kim, T.W., Soohoo, M., Gillen, D., Rhee, C.M. and Kovesdy, C.P., 2017. Association of body weight changes with mortality in incident hemodialysis patients. Nephrology Dialysis Transplantation, 32(9), pp.1549-1558*).

This accords with the findings of our study, as shown in figure 7. The average of weights among the died category of patients have decreased over the next 4 months of the study whereas the alive category's weight averages remained relatively constant during the six-month follow up period. This also harmonizes with the findings of *Kalantar-Zadeh et al* who concluded that worsening weight loss was associated with poor survival and weight gain was associated with decreased cardiovascular risk of death

independently of the nutritional status and laboratory findings. Another published study in 2013 included 6269 participants on regular hemodialysis and found that weight loss of less than 1% of body weight was associated with increased mortality rates and weight gain of more than 1% of body weight was associated with increased survival rates. (*Cabezas-Rodriguez, I., Carrero, J.J., Zoccali, C., Qureshi, A.R., Ketteler, M., Floege, J., London, G., Locatelli, F., Gorriz, J.L., Rutkowski, B. and Memmos, D., 2013. Influence of body mass index on the association of weight changes with mortality in hemodialysis patients. Clinical Journal of the American Society of Nephrology, 8(10), pp.1725-1733.*)

Our study showed the change in the total fluids in the body between before dialysis and after dialysis (which reflects the ultrafiltration or, inter-dialytic weight gain), the differences and variations were wider in the deceased patients compared with the rest of the kidney dialysis disease study participants, whose results reflected a relative stability of the differences between the percentage of total body fluids before and after dialysis.

The Total body water variability was almost constant among the alive category and almost in negative value (which means that the post dialysis weight is always less than pre-dialysis weight) and patients are tolerating ultrafiltration. This is in contrast to the deceased group whose values showed mixture of positive and negative values which can be explained by the fact that they have more comorbid conditions making them more liable for weight changes and less able for more ultrafiltration. This is also attributed to the hemodynamic instability of those patients during the dialysis sessions which affects their tolerance to the dialysis sessions. See figure 12

This is in contrast to the findings of other studies such as *Assimon et al* who investigated 118394 chronic hemodialysis patients with a median follow up time of 2.3 years. He reported that higher ultrafiltration was associated with increased mortality when normalized to body weight, body mass index and body surface area. (*Assimon, M.M., Wenger, J.B., Wang, L. and Flythe, J.E., 2016. Ultrafiltration rate and mortality in maintenance hemodialysis patients. American Journal of Kidney Diseases, 68(6), pp.911-922.)*

There is a strong correlation between the rapid fluid removal (more than 10ml/kg/hr) during dialysis and greater mortality rates and this is attributed to the end-organ ischemia from overt and subclinical hemodynamic instability. During dialysis, the fluid is directly removed from the vascular space and when the fluid removal outstands the capacity of vessels to refill from other compartments, circulating volume is reduced and transient ischemia might develop in the myocardial muscle. Moreover, this process is exaggerated when cardiac reserve has already been limited and by the presence of autonomic dysfunction which is so common among patients undergoing regular hemodialysis and have end stage renal disease *(Flythe, J.E., Kimmel, S.E. and Brunelli, S.M., 2011. Rapid fluid removal during dialysis is associated with cardiovascular morbidity and mortality. Kidney international, 79(2), pp.250-257.)*

The data suggested that greater ultrafiltration rates are associated with worse prognosis independently of the inter-dialytic weight gain and the more gradual volume removal the better the outcomes regardless of the magnitude of the weight gain (inter-dialytic weight gain). (The previous reference), (*Eldehni, M.T., Odudu, A. and McIntyre, C.W., 2015. Randomized clinical trial of dialysate cooling and effects on brain white matter. Journal of the American Society of Nephrology, 26(4), pp.957-965.)*

When referring to the results presented in Figure 11, the percentage of post dialysis weight was less in the deceased hemodialysis patients compared to the rest of the dialysis patients participating in the study. Figure 11 revealed that the post TBF began to gradually increase among the deceased patients as the deaths were occurred after the fourth month.

This is consistent with the published literature, as *Chang et al* reported a decrease in the post-dialysis weight and reached the nadir by the 5th months of dialysis. They concluded that higher death risks were related to incremental larger weight loss in the first one year and weight gain was associated with better survival. (*Chang, T.I., Ngo, V., Streja, E., Chou, J.A., Tortorici, A.R., Kim, T.H., Kim, T.W., Soohoo, M., Gillen, D., Rhee, C.M. and Kovesdy, C.P., 2017. Association of body weight changes with mortality in incident hemodialysis patients. Nephrology Dialysis Transplantation, 32(9), pp.1549-1558.)*

Similar findings were reported in many other studies. Kalantar-Zadeh et al examined the regression slope of weight changes to explore the impact of weight changes over time. His study included 54535 patients in the United States and concluded that higher cardiovascular mortality and poorer survival were linked to worsening weight loss. *(Kalantar-Zadeh, K., Kopple, J.D., Kilpatrick, R.D., McAllister, C.J., Shinaberger, C.S., Gjertson, D.W. and Greenland, S., 2005. Association of morbid obesity and weight change over time with cardiovascular survival in hemodialysis population. American journal of kidney diseases, 46(3), pp.489-500*.). Moreover, Chazot et al conducted another observational study that includd 5592 incident patients undergoing hemodialysis in Southern Europe in the period between Jan 2000 and Sep 2005 and also showed that patients whose weight remained unchanged in the first year of dialysis had

significantly higher survival rates compared with those with decrease in weight of about 5.8% in 1 year. Several studies have reported similar results as patients on regular hemodialysis who have short term weight loss and gains were associated with higher and lower mortality risk in the first six months of hemodialysis, respectively.

With a decrease in weight (less than 5.8% in 1 year) had significantly lower survival compared with patients whose body weight remained stable during the first year of dialysis. Similarly, several recent studies on weight changes among patients treated with MHD have consistently described that short-term weight gains and losses were associated with lower and higher mortality risk, respectively, in the first 6 months of dialysis. *(Chazot, C., Gassia, J.P., Di Benedetto, A., Cesare, S., Ponce, P. and Marcelli, D., 2009. Is there any survival advantage of obesity in Southern European haemodialysis patients?. Nephrology Dialysis Transplantation, 24(9), pp.2871-2876.)*

With regard to peripheral edema, interestingly, the deceased patients had less (2.0-2.3) lower limb edema compared with the alive ones (2.3 most of the time) as shown in figure 13. This goes with the other findings in our study shown in figure 10 as the total body water was lower among the deceased patients compared with the alive ones. However, some studies have concluded that peripheral edema as well as lung crackles, as a common classical clinical signs, have a very low sensitivity in detecting lung congestion to guide interventions aiming to mitigate lung congestion among high risk end stage renal disease patients. *(Torino, C., Gargani, L., Sicari, R., Letachowicz, K., Ekart, R., Fliser, D., Covic, A., Siamopoulos, K., Stavroulopoulos, A., Massy, Z.A. and Fiaccadori, E., 2016. The agreement between auscultation and lung ultrasound in hemodialysis*

patients: the LUST study. Clinical Journal of the American Society of Nephrology, 11(11), pp.2005-2011.)

On the other hand, it has been found that pedal edema has a strong association with many other cardiovascular risk factors such as age, obesity and left ventricular hypertrophy. However, edema has no correlation with the ejection fraction, B natri-uritic peptide or left atrial diameter. *(Agarwal, R., Andersen, M.J. and Pratt, J.H., 2008. On the importance of pedal edema in hemodialysis patients. Clinical Journal of the American Society of Nephrology, 3(1), pp.153-158.)* In other words, volume status assessment can involve many methods that include hormonal parameters (Renin, B natriuretic peptide) or radiographic parameters like Echocardiography and neither of them has a correlation with edema which makes it a poor marker for detecting intravascular volume among ESRD patients on regular hemodialysis. *(Same reference)* Although edema is not a predictor for intravascular volume, it has a strong correlation with the other cardiovascular risk factors which can be identified and treated. This makes edema, as a simple, bedside physical sign, an important method in detecting and then improving the risk factors and so the mortality in hemodialysis patients. *(Agarwal, R., Andersen, M.J. and Pratt, J.H., 2008. On the importance of pedal edema in hemodialysis patients. Clinical Journal of the American Society of Nephrology, 3(1), pp.153-158.)*

Patients' complaints were slightly higher among deceased patients when compared with the alive ones as shown in figure 8. Impaired sleep and pruritus are very common disorders among hemodialysis patients and are negatively associated with poor quality of life, increased mortality and depression. *(Orasan, O.H., Saplontai, A.P., Cozma, A., Racasan, S., Kacso, I.M., Rusu, C.C., Moldovan, D., Tirinescu, D., Potra, A., Patiu, I.M. and*

Orasan, R.A., 2017. Insomnia, muscular cramps and pruritus have low intensity in hemodialysis patients with good dialysis efficiency, low inflammation and arteriovenous fistula. International urology and nephrology, 49(9), pp.1673-1679.) Poor sleep might also lead to impaired immune system and increased risk of cardiovascular mortality and as a result, increased mortality rates among end stage renal disease patients. The presence of both, pruritus and insomnia has been associated with increased mortality rates and this was attributed mainly to moderate-severe uremic pruritus that led to impaired sleep (difficulty falling asleep or even frequent awakening in the night). *(Orasan, O.H., Muresan, F., Mot, A., Taut, A.S., Minciuna, I., Coste, S.C., Negrean, V., Orasan, R.A. and Cozma, A., 2020. Hemodialysis patients with pruritus and insomnia have increased risk of death. Blood purification, 49(4), pp.419-425.)*

One study concluded that there is a 17% increase in the mortality rate among patients with moderate to severe pruritus if associated with sleep disorders as the latter is thought to be linked to increased cardiovascular risk. *(Pisoni RL, Wikström B, Elder SJ, Akizawa T,Asano Y, Keen ML, et al. Pruritus in haemodialysis patients: international results fro the Dialysis Outcomes and Practice Patterns Study (DOPPS). Nephrol Dial Transplant. 2006 Dec;21(12):3495–505.)*

Insomnia, recovery time after hemodialysis session, pruritus and muscle cramps are among the health-related quality of life HRQOL parameters that can affect the ESRD patients' mental and physical status. Lower scores of HRQOL has been associated with increased risk of death and hospitalizations among ESRD patients on regular hemodialysis.

(Orasan, O.H., Saplontai, A.P., Cozma, A., Racasan, S., Kacso, I.M., Rusu, C.C., Moldovan, D., Tirinescu, D., Potra, A., Patiu, I.M. and Orasan, R.A.,

2017. Insomnia, muscular cramps and pruritus have low intensity in hemodialysis patients with good dialysis efficiency, low inflammation and arteriovenous fistula. International urology and nephrology, 49(9), pp.1673-1679.)

Our study clearly showed that alive patients were associated with lower rates of hospital admission episodes compared with the deceased ones as shown in figure 9. It is well-known that patients on chronic hemodialysis are at high risk for hospitalization compared with the general population. One study showed that the hospitalization rate was 0.12-0.14 per person year for the general population versus 1.74 per person year for patients on chronic hemodialysis in the United States and 0.99 per person year in Europe in 2012. *(Weiss, A.J. and Elixhauser, A., 2014. Overview of hospital stays in the United States, 2012: statistical brief# 180); (Rayner, H.C., Pisoni, R.L., Bommer, J., Canaud, B., Hecking, E., Locatelli, F., Piera, L., Bragg-Gresham, J.L., Feldman, H.I., Goodkin, D.A. and Gillespie, B., 2004. Mortality and hospitalization in haemodialysis patients in five European countries: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). Nephrology Dialysis Transplantation, 19(1), pp.108-120.)*

Infections and cardiovascular causes are on top of the causes of hospitalization for ESRD patients on regular hemodialysis. Hospitalization is associated with worsening physical functioning especially with the elderlies and those who experience re-hospitalization. Hospitalization has also been linked to functional disability, cognitive impairment and depression which all have a direct link to increased mortality rates.

(Shimizu, S., Fukuma, S., Ikenoue, T., Akizawa, T. and Fukuhara, S., 2018. Increased mortality rate after hospitalization among chronic hemodialysis patients: a prospective cohort study. Nephron, 140(3), pp.194-202.)

In other words, the hospitalization experience and its frequency, even if the cause of admission is nonmalignant, is associated with poorer prognosis for patients who survived the hospitalization episode. This is applicable for both patients with ESRD, end stage renal disease, and congestive heart failure. (Same previous reference).

Our findings also accords with the findings of many others who found that the frequency of hospitalization was directly related to increased mortality among ESRD hemodialysis patients *(Usvyat, L.A., Kooman, J.P., van der Sande, F.M., Wang, Y., Maddux, F.W., Levin, N.W. and Kotanko, P., 2014. Dynamics of hospitalizations in hemodialysis patients: results from a large US provider. Nephrology Dialysis Transplantation, 29(2), pp.442-448.)* and others have recommended to direct the physicians to reduce the preventable hospitalizations as cumulative number of hospitalizations was associated with increased post-discharge mortality. (*Shimizu, S., Fukuma, S., Ikenoue, T., Akizawa, T. and Fukuhara, S., 2018. Increased mortality rate after hospitalization among chronic hemodialysis patients: a prospective cohort study. Nephron, 140(3), pp.194-202.)*

Recommendations

1. Increasing the duration of hemodialysis in hospitals to 4 continuous hours, so that fluids can be withdrawn without burdening the patient.
2. Work to monitor the patient's dry weight.
3. A nursing assessment is carried out by the nurses, so that patients are constantly followed up to see any development in the patient's health.
4. Extensive studies on the same subject and extensively, in order to create a model (scale) that facilitates the evaluation process.

Conclusion

Assuming that these weight changes were unintentional, our study brings attention to rapid weight variations as a clinical sign of health monitoring in hemodialysis patients

References

- Abbasi, M. Chertow, G. & Hall, Y. (2010). **End-stage Renal Disease, Clinical Evidence Handbook**, Volume 82, Number 12.
- Abdul-Kareem, K. Lindo, J. & Stennett, R. (2019). ***Medical-surgical nurses' documentation of client teaching and discharge planning at a Jamaican hospital***. *International nursing review*, 66(2), 191–198.
- Allen, E. Williams, A. Jennings, D. Stomski, N. Goucke, R. Toye, C. Slatyer, S. Clarke, T. & McCullough, K. (2018). R***evisiting the Pain Resource Nurse Role in Sustaining Evidence-Based Practice Changes for Pain Assessment and Management***. **Worldviews on evidence-based nursing**, 15(5), 368–376.
- Aoki, J. and Ikari, Y. (2017). ***Cardiovascular Disease in Patients with End-Stage Renal Disease on Hemodialysis***, **Annals of Vascular Diseases;** 10 (4): 327-337.
- Assimon, M.M., Wenger, J.B., Wang, L. and Flythe, J.E. (2016). ***Ultrafiltration rate and mortality in maintenance hemodialysis patients***. **American Journal of Kidney Diseases**, *68*(6), pp.911-922.
- Baird, A. (2010). ***Acute pulmonary edema- management in general practice***, **Australian Family Physician**, vol. 39, no. 12, pp. 910-914.
- Beckerman, J. (2017). **What are symptoms of pulmonary edema?**, retrieved on 15/1/2019https://www.webmd.com/heart-disease/heart-failure/qa/what-are-sympt oms-of-pulmonary-edema
- Bhatti, N. Galougahi, K. Nazif, T. Moses, J. Stone, G. Karmpaliotis, D. (2016). ***Diagnosis and Management of Cardiovascular Disease in Advanced and End-Stage Renal Disease***, **Journal of the American Heart Association**, 11 (61).

- Brunner, S. & Suddarth, Z. (2006). **Textbook of Medical-Surgical Nursing**, 11th ed., SC Smeltzer et al. (eds.), Lippincott Williams & Wilkins.
- Cabezas-Rodriguez, I., Carrero, J.J., Zoccali, C., Qureshi, A.R., Ketteler, M., Floege, J., London, G., Locatelli, F., Gorriz, J.L., Rutkowski, B. and Memmos, D., (2013). ***Influence of body mass index on the association of weight changes with mortality in hemodialysis patients***. **Clinical Journal of the American Society of Nephrology**, *8*(10), pp.1725-1733.
- Chang, T.I., Ngo, V., Streja, E., Chou, J.A., Tortorici, A.R., Kim, T.H., Kim, T.W., Soohoo, M., Gillen, D., Rhee, C.M. and Kovesdy, C.P., (2017). ***Association of body weight changes with mortality in incident hemodialysis patients***. **Nephrology Dialysis Transplantation**, *32*(9), pp.1549-1558.
- Chazot, C., Gassia, J.P., Di Benedetto, A., Cesare, S., Ponce, P. and Marcelli, D. (2009). ***Is there any survival advantage of obesity in Southern European haemodialysis patients?*****. Nephrology Dialysis Transplantation**, *24*(9), pp.2871-2876.
- Chertow, G.M., Hsu, C.Y. and Johansen, K.L. (2006). **The enlarging body of evidence: obesity and chronic kidney disease**.
- Culver, B. & Glenny, R. (2012). **Pulmonary Circulation**, Clinical Respiratory Medicine (4th Edition), Pages 29-36.
- Doughty, R. & Sidebotham, D. (2007). **Heart Failure**, Cardiothoracic Critical Care 2007, Pages 278-292.
- Dunham, M. & MacInnes, J. (2018). ***Relationship of Multiple Attempts on an Admissions Examination to Early Program Performance***. **The Journal of nursing education**, 57(10), 578–583.

- Eldehni, M.T., Odudu, A. and McIntyre, C.W. (2015). ***Randomized clinical trial of dialysate cooling and effects on brain white matter***. **Journal of the American Society of Nephrology**, 26(4), pp.957-965.
- Enia, G. Torino, C. Panuccio, V. Tripepi, R. Aliotta, R. Bellantoni, M. Tripepi, G. Mallamaci, F. & Zoccali, C. (2013). **Asymptomatic Pulmonary Congestion and Physical Functioning in Hemodialysis Patients**, the American Society of Nephrology, Vol 8.
- Flythe, J.E., Kimmel, S.E. and Brunelli, S.M. (2011). ***Rapid fluid removal during dialysis is associated with cardiovascular morbidity and mortality***. **Kidney international**, *79*(2), pp.250-257.
- Forum of International Respiratory Societies. (2017). **The Global Impact of Respiratory Disease – Second Edition. Sheffi eld, European Respiratory Society**. pp7, 29.
- Gluhovschi, G. Velclov, S. Ligia, L. Gluhovschi, C. (2014). ***Aspects of Renal-Pulmonary Pathogenic Relationships in Chronic Kidney Disease and Chronic Pulmonary Diseases – A Less-Known Connection***, **Romanian journal of internal medicine**, 52, 2, 68–77.
- Gunen H, Hacievliyagil SS, Kosar F et al. (2005). **Factors affecting survival of hospitalised patients with COPD**. Eur Respir J 2005; 26: 234–241
- Hogan, M. (2007). **Medical-Surgical Nursing (2nd ed.)**. Salt Lake City: Prentice Hall.
- https://www.cdc.gov/obesity/adult/defining.html
- Kalantar-Zadeh, K., Block, G., Humphreys, M.H. and Kopple, J.D. (2003). ***Reverse epidemiology of cardiovascular risk factors in***

maintenance dialysis patients. **Kidney international**, *63*(3), pp.793-808.

- Kalantar-Zadeh, K., Kopple, J.D., Kilpatrick, R.D., McAllister, C.J., Shinaberger, C.S., Gjertson, D.W. and Greenland, S. (2005). ***Association of morbid obesity and weight change over time with cardiovascular survival in hemodialysis population***. **American journal of kidney diseases**, *46*(3), pp.489-500.
- Kopple, J.D., Zhu, X., Lew, N.L. and Lowrie, E.G. (1999). ***Body weight-for-height relationships predict mortality in maintenance hemodialysis patients***. **Kidney international**, *56*(3), pp.1136-1148.
- Lavie CJ, Milani RV, Ventura HO. (2009). **Obesity and cardiovascular disease: risk factor, paradox, and impact of weight loss**. J Am Coll Cardiol 2009; 53: 1925–1932
- Levine, G. (2016). **Illustrated Guide to Cardiovascular Disease,** 1st Edition**, The Health Science Publisher**, Panama.
- Liao, H. Lin, M. Tsai, C. Hsu, C. & Wu, T. (2018). ***Renal transplantation delays major adverse cardiac events (MACEs) in patients with end-stage renal disease: A nationwide population-based study***, **Journal of the Chinese Medical Association**; Vol. 81 (9), pp. 766-771.
- Liu, M. Li, X. Cao, Y. Sun, R. Chen, S. Zhang, P. (2014). **Cardiovascular disease and its relationship with chronic kidney disease**, Nanjing University of Chinese Medicine, Nanjing, Jiangsu, China.

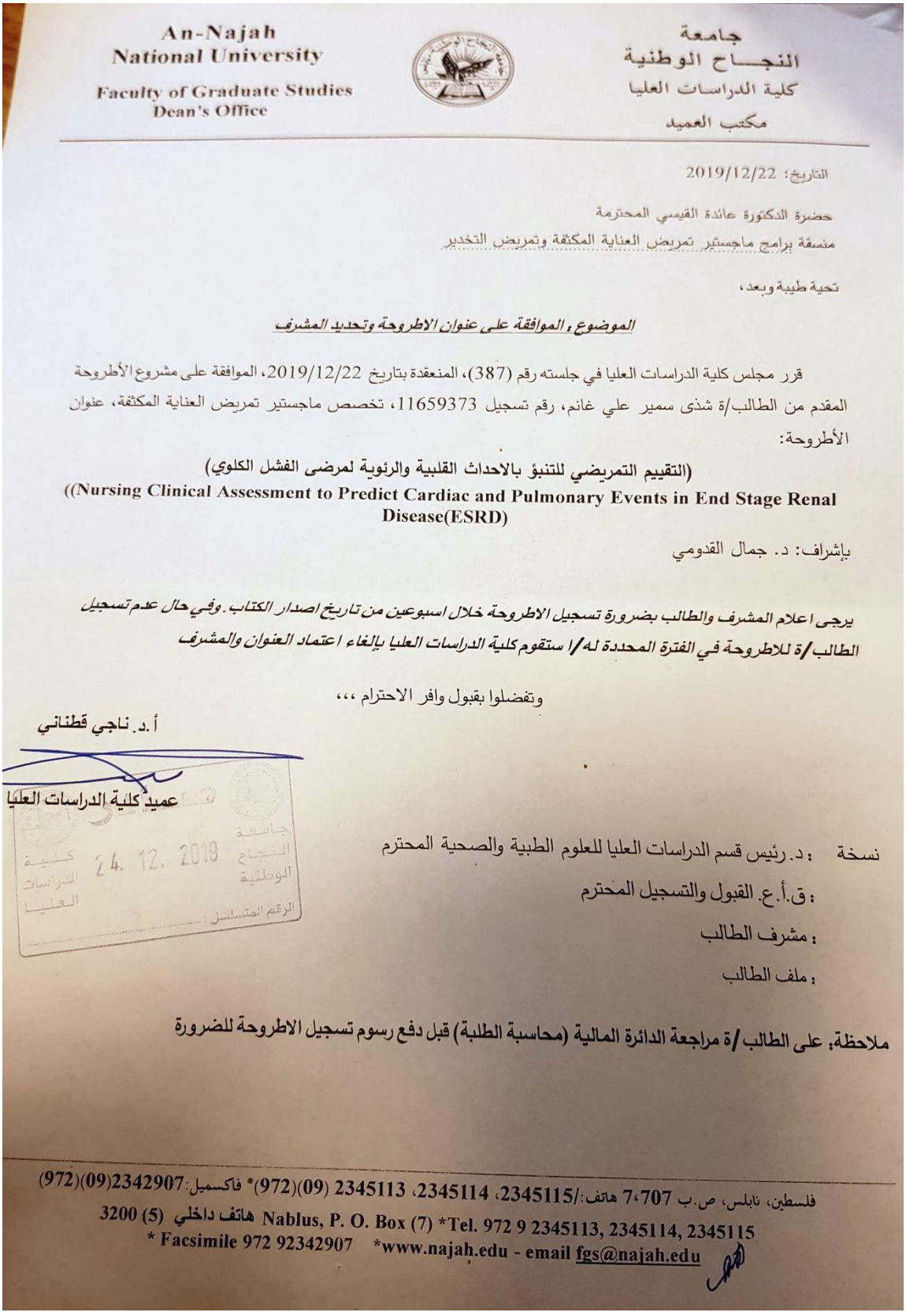
- Lust, R. (2007). **Pulmonary and Bronchial Circulation**, Reference Module in Biomedical Sciences xPharm: The Comprehensive Pharmacology Reference, Pages 1-8.
- Mahon, A. Jenkins, K. & Burnapp, L. (2013). ***Clinical assessment of the chronic kidney disease patient***, **Oxford University Press**, doi:10.1093/med/9780199600533.003.0002
- Matthay, M. & Murray, J. (2016). **62 - Pulmonary Edema**, Murray and Nadel's Textbook of Respiratory Medicine, Volume 2, 2016, Pages 1096-1117.e5.
- Mattu, A. (2015). **Cardiogenic Pulmonary Edema**, University of Maryland School of Medicine, Baltimore, Maryland.
- Mavrakanas, T. & Charytan, D. (2016).**Cardiovascular complications in chronic dialysis patients**, Curr Opin Nephrol Hypertens; 25(6): 536–544.
- Miglioranza, M. Picano, E. Badano, L. Sant'Anna, R. Rover, M. Zaffaroni, F. Sicari, R. Kalil, R. Leiria, T. & Gargani, L. (2017). ***Pulmonary congestion evaluated by lung ultrasound predicts decompensation in heart failure outpatients***, **International Journal of Cardiology** 240, 271–278.
- National Institutes of Health, (2011). **Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States**, Volume 2, pages 326-328.
- Park J, Ahmadi SF, Streja E et al. (2014). **Obesity paradox in end-stage kidney disease patients**. Prog Cardiovasc Dis 2014; 56: 415–425

- Rutherford, E. & Mark, P. (2017). ***What happens to the heart in chronic kidney disease?",*** **Journal of the Royal College of Physicians of Edinburgh**; 47(1):76-82.
- Seliger, L. Weiss, N. Cilen, D. Kestenbaum, B. Ball, A. Sherrard, D. & Breen, C. (2001). **HMG-CoA Reductase inhibitors are associated with reduced mortality in ESRD patients**, University of Washington School of Public Health, USA.
- Subbiah, A. Chhabra, Y. & Mahajan, S. (2016). **Cardiovascular disease in patients with chronic kidney disease: a neglected subgroup**, Department of Nephrology, All India Institute of Medical Sciences, New Delhi, India.
- Swanepoel**, C.** Atta, M. D'Agati, V. Estrella, M. Fogo, A. Naicker, S. Post, F. Wearne, N. Winkler, C. Cheung, M. Wheeler, D. Winkelmaye, W. & Wyatt, C. (2018). ***Kidney disease in the setting of HIV infection: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference***, **Kidney International**, 93, 545–559.
- Syed, F. McCullough, P. Birk, H. Renker, M. Brocca, A. Seeger, W. & Ronco, C. (2015). ***Cardio-Pulmonary-Renal Interactions: A Multidisciplinary Approach***, **Journal of the American College of Cardiology**, 65 (22).
- Toney-Butler, T. & Unison-Pace, W. (2021). ***Nursing Admission Assessment and Examination***. https://www.ncbi.nlm.nih.gov/book s/ NBK493211/
- Tudoran, M. Ciocarlie, T. Mates, A. Pescariu, S. Abu-Awwad, A. Tudoran, C. (2020). ***Pulmonary Hypertension in Patients with End***

Stage Renal Disease Undergoing Hemodialysis, **Nigerian Journal of Clinical Practice**, 23:198-204.

- Vareldzis, R., Naljayan, M. and Reisin, E. (2018). ***The incidence and pathophysiology of the obesity paradox: should peritoneal dialysis and kidney transplant be offered to patients with obesity and end-stage renal disease?.*** **Current hypertension reports**, *20*(10), p.84.
- Wang, A. Lam, C. Chan, H. Lui, S. & Sanderson, J. (2010). ***Sudden Cardiac Death in End-Stage Renal Disease Patients A 5-Year Prospective Analysis***, **Hypertension**; 56: 210-216.
- Watson, P. Watson, I. Batt, R. (2008). ***Total body water volumes for adult males and females estimated from simple anthropometric measurements***, **American Journal of Clinical Nutrition**, 33 (1): 27-39.
- Yan, M. Chao, C. & Lin, S. (2021). **Chronic Kidney Disease: Strategies to Retard Progression, International Journal of Molecular Sciences**, 22, no. 18: 10084. https://doi.org/10.3390/ijms 221810084
- Yilmaz, S. Yildirim, Y. Yilmaz, Z. Kara, A. Taylan, M. Demir, M. Coskunsel, M. Kadiroglu, A. Yilmaz, M. (2016). **Pulmonary Function in Patients with End-Stage Renal Disease: Effects of Hemodialysis and Fluid Overload**, Med Sci Monit; 22: 2779-2784.
- Zoccali, C. Torino, C. Tripepi, R. Tripepi, G. D'Arrigo, G, Postorino, M. (2013). ***Pulmonary Congestion Predicts Cardiac Events and Mortality in ESRD,*** **National Research Council-Institute of Clinical Physiology**, Pisa, Italy; 24(4):639-46.
- Zoccali, C. Tripepi, R. Torino, C. Bellantoni, M. Tripepi, G. & Mallamaci, F. (2013). ***Lung Congestion as a Risk Factor in End-Stage Renal Disease,*** **Blood Purification**, 36:184–191.

Appendices



An-Najah
National University
Faculty of Graduate Studies
Dean's Office

جامعة
النجـــاح الوطنية
كلية الدراسات العليا
مكتب العميد

التاريخ: 2019/12/22

حضرة الدكتورة عائدة القيسي المحترمة
منسقة برامج ماجستير تمريض العناية المكثفة وتمريض التخدير

تحية طيبة وبعد،

الموضوع: الموافقة على عنوان الاطروحة وتحديد المشرف

قرر مجلس كلية الدراسات العليا في جلسته رقم (387)، المنعقدة بتاريخ 2019/12/22، الموافقة على مشروع الأطروحة المقدم من الطالب/ة شذى سمير علي غانم، رقم تسجيل 11659373، تخصص ماجستير تمريض العناية المكثفة، عنوان الأطروحة:

(التقييم التمريضي للتنبؤ بالاحداث القلبية والرئوية لمرضى الفشل الكلوي)
((Nursing Clinical Assessment to Predict Cardiac and Pulmonary Events in End Stage Renal Disease(ESRD)

بإشراف: د. جمال القدومي

يرجى اعلام المشرف والطالب بضرورة تسجيل الاطروحة خلال اسبوعين من تاريخ اصدار الكتاب. وفي حال عدم تسجيل الطالب/ة للاطروحة في الفترة المحددة له/ا ستقوم كلية الدراسات العليا بإلغاء اعتماد العنوان والمشرف

وتفضلوا بقبول وافر الاحترام ،،،

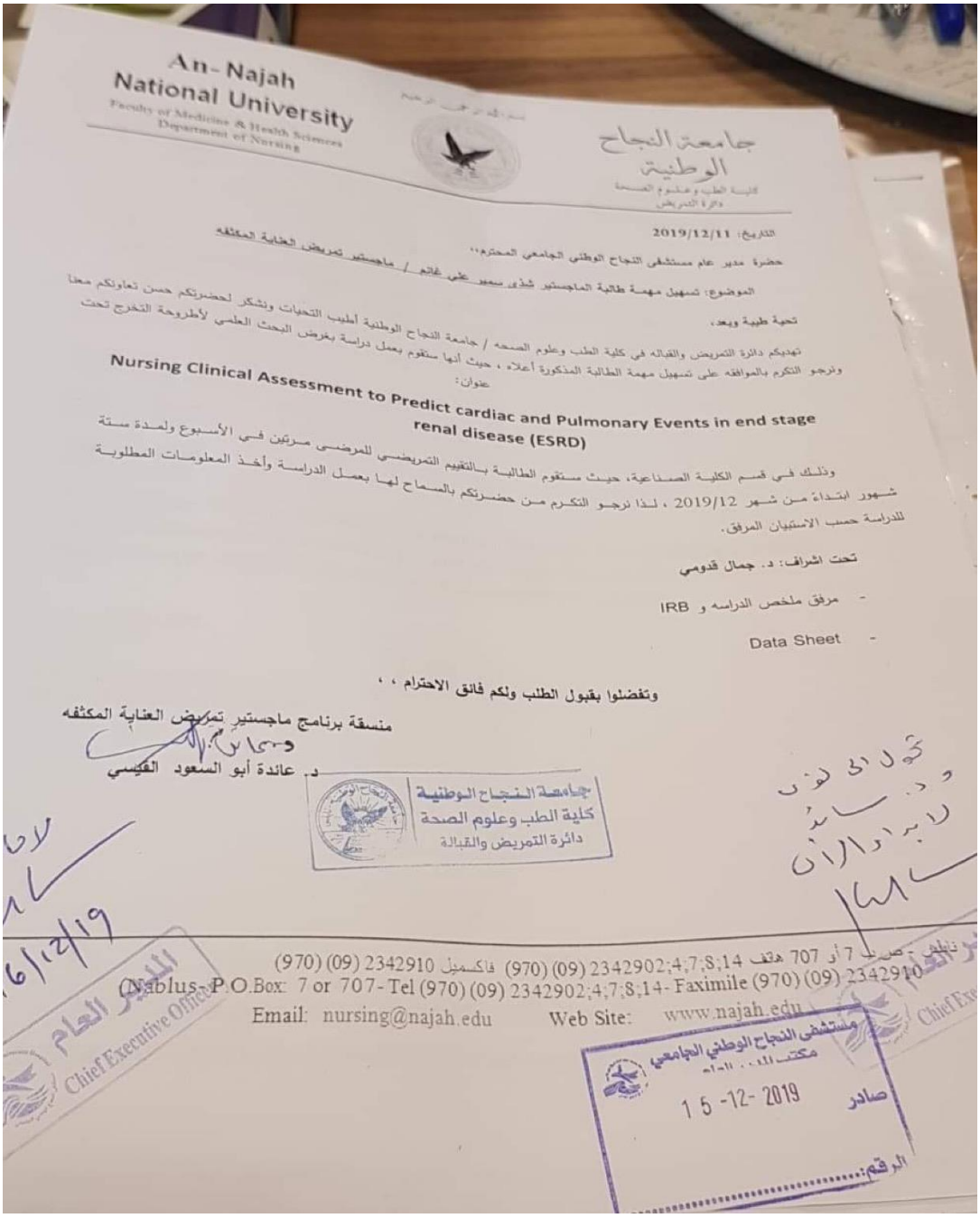
أ.د. ناجي قطناني
عميد كلية الدراسات العليا

جامعة النجاح الوطنية
كلية الدراسات العليا
24. 12. 2019
الرقم المتسلسل:

نسخة : د. رئيس قسم الدراسات العليا للعلوم الطبية والصحية المحترم
: ق.أ.ع. القبول والتسجيل المحترم
: مشرف الطالب
: ملف الطالب

ملاحظة: على الطالب/ة مراجعة الدائرة المالية (محاسبة الطلبة) قبل دفع رسوم تسجيل الاطروحة للضرورة

فلسطين، نابلس، ص.ب 707، 7 هاتف: 2345115/، 2345114، 2345113 (09)(972)* فاكسميل: 2342907(09)(972)
Nablus, P. O. Box (7) *Tel. 972 9 2345113, 2345114, 2345115 هاتف داخلي (5) 3200
* Facsimile 972 92342907 *www.najah.edu - email fgs@najah.edu



An- Najah
National University
Faculty of Medicine & Health Sciences
Department of Nursing

جامعة النجاح
الوطنية
كلية الطب وعلوم الصحة
دائرة التمريض

التاريخ: 2019/12/11

حضرة مدير عام مستشفى النجاح الوطني الجامعي المحترم،،

الموضوع: تسهيل مهمة طالبة الماجستير شذى سمير علي غانم / ماجستير تمريض العناية المكثفه

تحية طيبة وبعد،

تهديكم دائرة التمريض والقبالة في كلية الطب وعلوم الصحه / جامعة النجاح الوطنية أطيب التحيات وتشكر لحضرتكم حسن تعاونكم معنا ونرجو التكرم بالموافقه على تسهيل مهمة الطالبة المذكورة أعلاه ، حيث أنها ستقوم بعمل دراسة بغرض البحث العلمي لأطروحة التخرج تحت عنوان:

Nursing Clinical Assessment to Predict cardiac and Pulmonary Events in end stage renal disease (ESRD)

وذلك في قسم الكلية الصناعية، حيث ستقوم الطالبة بالتقييم التمريضي للمرضى مرتين في الأسبوع ولمدة ستة شهور ابتداءً من شهر 2019/12 ، لذا نرجو التكرم من حضرتكم بالسماح لها بعمل الدراسة وأخذ المعلومات المطلوبة للدراسة حسب الاستبيان المرفق.

تحت اشراف: د. جمال قدومي

- مرفق ملخص الدراسه و IRB
- Data Sheet

وتفضلوا بقبول الطلب ولكم فائق الاحترام ،،

منسقة برنامج ماجستير تمريض العناية المكثفه

د. عائدة أبو السعود القيسي

جامعة النجاح الوطنية
كلية الطب وعلوم الصحة
دائرة التمريض والقبالة

المدير العام
Chief Executive Officer

مستشفى النجاح الوطني الجامعي
مكتب المدير العام
صادر
15-12-2019
الرقم:

نابلس - ص.ب 7 أو 707 هاتف (970) (09) 2342902;4;7;8;14 فاكسميل (970) (09) 2342910
(Nablus- P.O.Box: 7 or 707- Tel (970) (09) 2342902;4;7;8;14- Faximile (970) (09) 2342910
Email: nursing@najah.edu Web Site: www.najah.edu

استمارة موافقة مشارك

أنا .....:

أوافق على المشاركة في البحث العلمي الذي سيجرى في مستشفى النجاح الوطني الجامعي– نابلس للمرضى اللذين يخضعون لغسيل الكلى ويعانون من الفشل الكلوي المزمن وسيتم البحث عن طريق الفحص والتقييم التمريضي السريري والهدف منه التنبؤ في الأمراض القلبية والرئوية لمرضى الكلى وسيتم الفحص مرتين في الاسبوع لكمية السوائل المحتبسة في الجسم ولم يتم سحبها , وللأصوات الرئوية والقلبية الغير طبيعية ,ومراقبة الوزن الثابت ومتابعته ,وعدد مرات الدخول الى المستشفى لتلقي العلاج , ومتابعة شكاوي المرضى لمضاعفات او الآلام التي يعاني منها المريض، ولجميع العوامل التي تساعد على اكتشاف المرضى قبل تفاقمها وبدون تكاليف وزيارات متكررة الى المستشفى .

أدرك أن البحث سيجرى بالطريقة التي تم وصفها شفهيا ونظريا من قبل الباحث.

ستُعاد نسخة من استمارة الموافقة هذه إليّ مع ملاحظاتي لاعتمادهما وستظل معلوماتي طي الكتمان. أفهم أنني أستطيع بحريتي أن أغيّر أية ملاحظات أو أن أنسحب من البحث في أي وقت.

نموذج الموافقة وما قاله لي الممثل الصحي:

اسم المريض: الاسم بوضوح.....:

التوقيع.....:

التاريخ..... :

اسم الباحث: الاسم بوضوح..... :

التوقيع.....:

التاريخ..... :

لقد أخبرت الشخص/الأشخاص أعلاه بهذا البحث وأنا متأكدة من أنه/أنهم يفهمون محتوى البحث العلمي وتم شرح ما سيتم فعله وأنه لا يوجد أي مخاطر جسدية أو نفسية ممكن أن يتعرضوا لها وفهم استمارة موافقة المريض.

جامعة النجاح الوطنية

كلية الدراسات العليا

التقيم التمريضي للتنبؤ بالأحداث القلبية والرئوية لمرضى الفشل الكلوي

إعداد

شذى غانم

إشراف

د. جمال القدومي

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في تمريض العناية المكثفه في كلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2021

التقيم التمريضي للتنبؤ بالأحداث القلبية والرئوية لمرضى الفشل الكلوي

إعداد

شذى غانم

إشراف

د. جمال القدومي

الملخص

هدفت هده الدراسة إلى تقييم فعالية التقييم السريري التمريضي وحساب كمية السوائل المتجمعة في الجسم في التنبؤ بالأمراض القلبية والرئوية لدى المرضى الذين يعانون من الفشل الكلوي المزمن .

استخدمة الباحثة تصميم الدارسة المستقبلية والذي يعني أخذ مجموعة من الموضوعات ومشاهدتها على مدى فترة طويلة. أجريت هذه الدراسة في فلسطين في مستشفى النجاح الوطني في قسم غسيل الكلى. وشملت عينة البحث (280) مريضا من قسم الكلى الصناعية بمستشفى جامعة النجاح الوطني.

أظهرت نتائج الدراسة أن المرضى المتوفين لديهم معدلات أعلى من وزن الجسم والشكاوى ونوبات الاستشفاء مقارنة بنظرائهم في الوحدة خلال فترة الدراسة التي استمرت 6 أشهر ، فيما يتعلق بالمرضى الذين يخضعون لغسيل الكلى، فقد وجد أن هناك علاقة عكسية بين مؤشر كتلة الجسم وخطر الوفاة والتي أثبتتها العديد من الدراسات السابقة حيث أن مؤشر كتلة الجسم الأساسي الأعلى مرتبط بنتائج أفضل.

كان التغيير في إجمالي السوائل في الجسم بين ما قبل غسيل الكلى وبعد غسيل الكلى (الذي يعكس الترشيح الفائق أو زيادة الوزن بين الكلى)، كانت الفروق والاختلافات أوسع في المرضى المتوفين مقارنة ببقية المشاركين في دراسة مرض غسيل الكلى والتي عكست نتائجها ثبات نسبي

في الفروق بين النسبة المئوية لسوائل الجسم الكلية قبل وبعد غسيل الكلى، وهناك علاقة ارتباط قوية بين سرعة إزالة السوائل (أكثر من 10 مل / كجم / ساعة) أثناء غسيل الكلى ومعدلات وفيات أعلى وهذا يعزى إلى نقص التروية في نهاية العضو من عدم استقرار الدورة الدموية العلني وتحت السريري. ارتبط المرضى الأحياء بانخفاض معدلات نوبات دخول المستشفى مقارنة بالمرضى المتوفين. من المعروف أن المرضى الذين يخضعون لغسيل الكلى المزمن معرضون لخطر دخول المستشفى مقارنةً بعامة الناس.

أوصى الباحث بما يلي:

1. زيادة مدة غسيل الكلى في المستشفيات إلى 4 ساعات متواصلة لسحب السوائل دون إثقال كاهل المريض.
2. العمل على مراقبة الوزن الثابت للمريض بشكل متكرر من خلال تنفيذ التقييم التمريضي والسريري ، بحيث يتم متابعة المرضى باستمرار لمعرفة أي تطور في صحة المريض.
3. يوصى بشدة بإجراء مزيد من الدراسات لتقييم فعالية التقييم الإكلينيكي التمريضي الآخر في التنبؤ بالنتائج والأمراض المصاحبة للمرضى.