

**QUALITY OF LIFE AND COMPLIANCE WITH
FLUID RESTRICTION AMONG HEMODIALYSIS
PATIENTS IN HOSPITAL UNIVERSITI SAINS
MALAYSIA**

SITI ANIZA BT MOHAMAD

**DEGREE OF BACHELOR OF NURSING
(HONOURS)
SCHOOL OF HEALTH SCIENCES
UNIVERSITI SAINS MALAYSIA**

2023

**QUALITY OF LIFE AND COMPLIANCE WITH
FLUID RESTRICTION AMONG HEMODIALYSIS
PATIENTS IN HOSPITAL UNIVERSITI SAINS
MALAYSIA**

SITI ANIZA BT MOHAMAD

**Dissertation submitted in partial fulfilment of the
requirements for the degree
of Bachelor of Nursing (Honours)**

JUNE 2023

ACKNOWLEDGEMENT

Assalamualaikum. First and foremost, I would like to express my gratitude to Allah s.w.t for giving me strength, patience and guidance completing this dissertation within timeframe.

I would like to express my gratitude to Sir Ali Aminuddin and Sir Mohd Noor, my supervisors, for his guidance and encouragement during my final year project. I am grateful for their intelligent opinions, advice and support guiding me through this study process. As this is my first time handling a research study, it was challenging and new thing for me to accomplish without their expertise. The goal of this study would not have been achieved without their support. Also, I would like to thank all the patients who participated in this study for their contributions and cooperation.

I would like to thank my parents, Mr. Mohamad bin Aman and Mrs. Habsah bt Sebi for their endless support and duas. I deeply appreciated the contributions of all those who have directly or indirectly encouraged me in successfully finishing my thesis. I would not have any words to describe how thankful I am to have my family, friends and lecturers for the kindness and laughter shown to me by everyone.

Last but not least, I want to thank me for believing in me, doing all this hard work and never quitting despite all the challenges.

Table of Contents

CERTIFICATE	i
DECLARATION	ii
ACKNOWLEDGEMENT	iii
LIST OF TABLES.....	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATION	viii
CHAPTER 1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Research Questions.....	5
1.4 Research Objective	6
1.4.2 Specific Objectives:.....	6
1.5 Research Hypothesis.....	7
1.6 Conceptual and Operational Definition.....	8
1.7 Significance of Study	13
CHAPTER 2 LITERATURE REVIEW.....	14
2.1 Introduction.....	14
2.2 Kidney Disease.....	14
2.3 Hemodialysis.....	17
2.4 Quality of Life.....	20
2.5 Quality of Life among Hemodialysis Patients.....	22
2.6 Restriction of Fluid.....	24
2.7 Compliance to Fluid Restriction.....	25
2.8 Theoretical & Conceptual Framework of Study	29
CHAPTER 3 RESEARCH METHODOLOGY	33
3.1 Introduction.....	33
3.2 Research Design.....	33
3.3 Research Location	33
3.4 Research Duration	33
3.5 Research Population	33

3.6 Subject Criteria	34
3.7 Sampling Plan.....	35
3.7.1 Sampling Size Estimation	35
3.7.2 Sampling Method.....	41
3.8 Research Instrument	41
Instrument.....	41
Validity and Reliability	43
3.9 Variables.....	44
3.9.1 Variable Measurement.....	44
3.9.2 Variable Scoring	45
3.10 Data Collection	46
3.10.1 Procedure of Data Collection.....	46
3.10.2 Study Flowchart.....	47
3.11 Data Analysis	48
3.12 Expected Outcome of the Study.....	49
3.12.1 Socio-demographic data of respondent.....	49
3.12.2 Compliance to Fluid Restriction.....	51
3.12.3 Quality of Life.....	51
3.13 Ethical Consideration	52
CHAPTER 4 RESULTS	54
4.1 Introduction.....	54
4.2 Results of study.....	55
4.2.1 Sociodemographic characteristics	55
4.2.2 Level of Quality of Life	57
4.2.3 Level of Compliance with Fluid Restriction.....	60
4.2.4 Relationship between Quality of Life and Compliance with Fluid Restriction	62
4.2.5 Relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and quality of life	63
4.2.6 Relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and compliance with fluid restriction	65
CHAPTER 5 DISCUSSION	67
5.1 Sociodemographic of respondents	68
5.2 Level of Quality of Life.....	70
5.3 Level of Compliance with Fluid Restriction	71
5.4 Association between quality of life and compliance with fluid restriction.....	72
5.5 Association between sociodemographic factors and level of quality of life.....	73
5.6 Association between sociodemographic factors and level of compliance with fluid restriction	78
5.6 Strength and limitation of study	82
5.6.1 Strength.....	82
5.6.2 Limitation	82
CHAPTER 6 CONCLUSION.....	84

6.1 Summary of the findings	84
6.2 Implication and recommendation.....	85
6.2.1 Implication of Healthcare Providers Practice	85
6.2.2. Implication of Healthcare Providers Education	85
6.3 Recommendation for Future Research.....	86
6.4 Conclusion	86
CHAPTER 7 REFERENCES	87
CHAPTER 8 APPENDICES	94
8.1 Appendix A: Instrument.....	94
8.2 Appendix B: Permission from the Author.....	101
8.3 Appendix C: Research Information and Consent Form	103
LAMPIRAN S.....	107
LAMPIRAN P.....	108
8.4 Appendix D : Gantt Chart and Planned Research Milestone.....	109
8.5 Appendix E: Infographic	110
8.6 Appendix F: Institutional Approval (Permission to Conduct the Study)	113
8.7 Appendix G: Ethical Approval.....	116

LIST OF TABLES

<i>Table 3. 1: Socio-demographic data of respondents</i>	49
<i>Table 3. 2: Level of Compliance to Fluid Restriction</i>	51
<i>Table 3. 3: Score of Quality of Life</i>	51
<i>Table 3. 4: Level of Quality of Life</i>	51
<i>Table 4. 1: Respondent Sociodemographic Characteristics among Hemodialysis Patients, (n=50)</i>	55
<i>Table 4. 2: World Health Organization Quality of Life Brief Version (WHOQOL-BREF), (n=50)</i>	57
<i>Table 4. 3: Frequency and percentage of domain in QOL, (n=50)</i>	59
<i>Table 4. 4: Frequency and percentage of level of QOL, (n=50)</i>	59
<i>Table 4. 5: Compliance with Fluid Restriction, (n=50)</i>	60
<i>Table 4. 6: Level of Compliance with Fluid Restriction, (n=50)</i>	61
<i>Table 4. 7: The Fisher Exact Test</i>	62
<i>Table 4. 8: Association between sociodemographic factors and level of QOL, (n=50)</i>	63
<i>Table 4. 9: Association between sociodemographic factors and level of compliance with fluid restriction, (n=50)</i>	65

LIST OF FIGURES

<i>Figure 2. 1 Hemodialysis</i>	18
<i>Figure 2. 2 Spitzer's QL-Index by Spitzer WO, Dobson AJ, Hall J, et al., 1981</i>	21
<i>Figure 2. 3 Roy Adaptation Model</i>	29
<i>Figure 2. 4 Roy Adaptation Model (Adopted from Sister Callista Roy)</i>	32

LIST OF ABBREVIATION

AKI	Acute kidney disease
CKD	Chronic kidney disease
ESRF	End stage renal failure
GFR	Glomerular filtration rate
IDWG	Interdialytic weight gain
QOL	Quality of life
USM	Universiti Sains Malaysia
WHOQOL-BREF	World Health Organization Quality of Life Brief Version

**KUALITI HIDUP DAN KEPATUHAN KEPADA HAD CECAIR DALAM
KALANGAN PESAKIT HEMODIALISIS DI HOSPITAL UNIVERSITI SAINS
MALAYSIA**

ABSTRAK

Kajian keratan rentas telah dijalankan untuk mengkaji kualiti hidup dan pematuhan had cecair dalam kalangan pesakit hemodialisis di Hospital Universiti Sains Malaysia. Memandangkan peningkatan pesakit hemodialisis sejak beberapa tahun di Malaysia, adalah penting semua pesakit hemodialisis mematuhi rejimen rawatan hemodialisis (diet, sekatan cecair, ubat-ubatan) untuk menstabilkan kualiti hidup mereka. Soal selidik yang digunakan dalam kajian ini ialah World Health Organization Quality of Life Brief Version (WHOQOL-BREF) yang diadaptasi daripada Pertubuhan Kesihatan Sedunia (WHO) dan pematuhan sekatan cecair oleh Hirmawaty (2014). Seramai 50 pesakit hemodialisis di Hospital USM yang memenuhi kriteria inklusi dan pengecualian telah dipilih secara rawak. Pengumpulan data dianalisis secara statik menggunakan perisian SPSS versi 27.0. Ujian Fisher Exact digunakan untuk analisis data. Bagi kualiti hidup dan pematuhan skor had cecair, keputusan menunjukkan 34 pesakit (68%) dalam tahap baik dan 20 pesakit (40%) dalam pematuhan rendah masing-masing. Tiada hubungan antara kualiti hidup dan pematuhan sekatan cecair (nilai $p = 0.836$). Selain itu, terdapat hubungan yang signifikan antara status perkahwinan dengan pematuhan sekatan cecair (nilai $p = 0.026$), keputusan menunjukkan 15 pesakit berada dalam tahap pematuhan rendah. Selain itu, tiada hubungan antara faktor sosiodemografi lain dan kualiti hidup serta pematuhan sekatan cecair. Kesimpulannya, pengetahuan dan amalan rejimen rawatan pesakit perlu dipertingkatkan dan dipertingkatkan supaya mereka berpengetahuan dan dapat mematuhi rejimen rawatan seterusnya meningkatkan kualiti hidup mereka.

QUALITY OF LIFE AND COMPLIANCE OF FLUID RESTRICTION AMONG HEMODIALYSIS PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRACT

A cross-sectional study was carried out to study the quality of life and compliance with fluid restriction among hemodialysis patients in Hospital Universiti Sains Malaysia. As the increasing of hemodialysis patients over the years in Malaysia, it is crucial all hemodialysis patients to comply the treatment regimens of hemodialysis (diet, fluid restriction, medication) to stabilize their quality of life. The questionnaire used in this study was World Health Organization Quality of Life Brief Version (WHOQOL-BREF) adapted from World Health Organization and compliance of fluid restriction by Hirmawaty (2014). A total of 50 hemodialysis patients in Hospital USM who fulfilled the inclusion and exclusion criteria were selected randomly. Data collection were statically analyzed using SPSS software version 27.0. Fisher's exact test was used for data analysis. As for the quality of life and compliance of fluid restriction score, the results show 34 patients (68%) in good level and 20 patients (40%) in low compliance respectively. There was no relationship between quality of life and compliance of fluid restriction (p value = 0.836). Moreover, there was a significant relationship between marital status and compliance of fluid restriction (p value = 0.026), the results show 15 patients are in the low compliance level. Aside from that, there were no relationship between other sociodemographic factors and quality of life and compliance of fluid restriction. In conclusion, patients' knowledge and practice of treatment regimens has to be enhanced and improved so they will be knowledgeable and able to comply to treatment regimens thus increasing their quality of life.

CHAPTER 1 INTRODUCTION

1.1 Background

Hemodialysis is one of the renal replacement therapies. Hemodialysis will ensure the maintenance of homeostasis in the body. The indications for hemodialysis are acute kidney injury (AKI) and chronic kidney disease (CKD) in stage 5 which is end stage renal failure (Murdeshwar & Anjum, 2022). A machine called dialyzer or “artificial kidney” has a semipermeable membrane. The semipermeable membrane will filter the waste and excess water in the patient’s blood. The filtration process will create a counter current flow where the flow of blood from dialyzer and body will be in an opposite direction (Vadakedath & Kandi, 2017).

Quality of life is defined as “an individual perception of their position in life in the context of culture and value system where they live, and in relation to their goals, expectations, standards, and concerns” (World Health Organization, 2008). Hemodialysis patients’ quality of life are affected resulting to the needs of treatments. Hemodialysis therapy is expensive, time consuming and need high compliance to diet, fluid restrictions and medication. Moreover, hemodialysis therapy may affect the marital status, financial status, freedom, increase dependency and loss of social life (Ravindran et al., 2020).

Compliance towards treatment regimens such as fluid intake is vital role in maintaining kidney functioning. Fluid restriction is defined as the limit volume for an individual to drink per day and it is one of the hardest treatment regimens to comply (Chan et al., 2012a). Factors such as age, family support, level of educations play part in patient’ compliance discipline (Tindel, 2020). Poor compliance will cause complications, worse health conditions, increase hospitalization and the risk of mortality and morbidity (Murali et al., 2019).

In some patients, fluid restriction may become the source of stress for haemodialysis patients due to the thirst and low recommended fluid volume (Widyawati et al., 2019). Stress will decrease the patients' quality of life. Thus, this study aimed to study the compliance to fluid restriction among hemodialysis patients in Hospital USM.

1.2 Problem Statement

Hemodialysis therapy is cost consuming where it consumed the healthcare budget. At the end of 2016, there are 37,781 patients who had renal replacement therapy in Malaysia, and it is expected the number will rise each year (Saminathan et al., n.d.-a). Hemodialysis has become the financial burden for country. The government has funded the hemodialysis therapy for more than 50% of the cost (National Renal Registry, 2018).

Hemodialysis patients have to comply to treatment regimens such as restriction fluid intake, dietary restriction, dialysis session and medication. Most of the patients are aware of treatment regimens yet failed to comply to it. (Beerappa & Chandrababu, 2019a).

A study by Efe & Kocaöz in Turkey show the highest incompliance to fluid restriction. The result of the study show 95% of the respondents are incompliance to fluid restriction (Efe & Kocaöz, 2015a).

A study by Chan et al. in Malaysia show compliance to fluid (24.5%) is the lowest among other treatment regimens which are diet (27.7%), medication (66.5%) and dialysis (91%). Moreover, 86.2% of the subjects admitted compliant to fluid prescription was the most difficult and challenging aspect, especially during hot weather (Chan et al., 2012b).

Compliance to the treatment regimens will sustain good quality of life. The complication from the low compliance such as cardiovascular disease and hypertension will affect the patients' quality of life. A good quality of life will increase the patients' lifespan and promote positive outcome from treatments. Thus, knowing the compliance to fluid restriction is importance to understand the patients' quality of life.

There are many studies done to investigate the quality of life and compliance to fluid restriction separately but there are only a few studies done in Malaysia investigating

the association between these two. Moreover, from the stated studies, it shows that the hemodialysis patients have low compliance of treatment regimens, thus it is one of the obstacle which we need to highlight. Thus, this research aim is to investigate the relationship between quality of life and compliance to fluid restriction among hemodialysis patients in Hospital USM.

1.3 Research Questions

- i. What is the level of quality of life among hemodialysis patients in Hospital USM?
- ii. What is the level of compliance with fluid restriction among hemodialysis patients in Hospital USM?
- iii. Is there any relationship between quality of life and compliance with fluid restriction among hemodialysis patients in Hospital USM?
- iv. Is there any relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and quality of life among hemodialysis patients in Hospital USM?
- v. Is there any relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and compliance with fluid restriction among hemodialysis patients in Hospital USM?

1.4 Research Objective

1.4.1 General Objective:

To study the relationship between quality of life and compliance with fluid restriction among hemodialysis patients in Hospital Universiti Sains Malaysia.

1.4.2 Specific Objectives:

- i. To determine the level of quality of life among hemodialysis patients in Hospital USM.
- ii. To determine the level of compliance with fluid restriction among hemodialysis patients in Hospital USM.
- iii. To examine the relationship between quality of life and compliance with fluid restriction among hemodialysis patients in Hospital USM.
- iv. To examine the relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and quality of life among hemodialysis patients in Hospital USM.
- v. To examine the relationship between selected socio-demographic factors (age, race, marital status, comorbidities, employment status, education, household income) and compliance with fluid restriction among hemodialysis patients in Hospital USM.

1.5 Research Hypothesis

Hypothesis 1 : There is no significant relationship between quality of life and compliance

with fluid restriction among hemodialysis patients in Hospital USM (**H₀**)

: There is a significant relationship between quality of life and compliance

with fluid restriction among hemodialysis patients in Hospital USM (**H_A**)

Hypothesis 2 : There is no significant relationship between selected socio-demographic

factors (age, race, marital status, comorbidities, employment status,

education, household income) and quality of life among hemodialysis

patients in Hospital USM (**H₀**)

: There is a significant relationship between selected socio-demographic

factors (age, race, marital status, comorbidities, employment status,

education, household income) and quality of life among hemodialysis

patients in Hospital USM (**H_A**)

Hypothesis 3 : There is no significant relationship between selected socio-demographic

factors (age, race, marital status, comorbidities, employment status,

education, household income) and compliance with fluid restriction

among hemodialysis patients in Hospital USM (**H₀**)

: There is a significant relationship between selected socio-demographic

factors (age, race, marital status, comorbidities, employment status,

education, household income) and compliance with fluid restriction

among hemodialysis patients in Hospital USM (**H_A**)

1.6 Conceptual and Operational Definition

Hemodialysis

Conceptual Hemodialysis is an artificial replacement of kidney which involve the process of removal of waste and extra water from blood (Vadakedath & Kandi, 2017).

Operational Distinction between hemodialysis and peritoneal dialysis is hemodialysis requires an artificial kidney machine while peritoneal dialysis use the lining of abdomen for blood filtration (John M Burkart, 2022). Hemodialysis is indicated for patients with end stage renal disease who glomerular filtration rate less than 15ml/min (Vadakedath & Kandi, 2017). This study will be conducted among hemodialysis patients in Hospital USM.

Quality of Life

Conceptual Quality of life defined as ‘individuals’ perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns (World Health Organization, 2008).

Operational The quality of life among ESRF patients in Hospital USM will be measured using the World Health Organization Quality of Life – Brief Version (WHOQOL-BREF) questionnaire which developed by World Health Organization (WHO). The WHOQOL-BREF is self-reported questionnaire developed and applicable for cross culturally.

Compliance

- Conceptual Adherence is the right of an individual to decide whether or not he or she should follow the therapeutic advice and that an individual takes an active part in a treatment strategy (VR & Kaur Kang, 2021a).
- Operational The adherence to fluid restriction among hemodialysis patients in Hospital USM will be assessed in this study.

Restriction of Fluid

- Conceptual Restriction of fluid is when an individual is advised to drink limited volume of fluid per day (National Health Service, 2018). Restriction of fluid is indicated in patients who have edema associated with kidney disease, such as nephrosis and glomerulonephritis, or cirrhosis, and also in certain patients with pulmonary edema. (Miller-Keane Encyclopedia and Dictionary of Medicine, 2003).
- Operational The volume of fluid restriction for ESRF patients is decided by physician using the formula (Stacey Sales, 2020):

$$\text{Fluid intake} = \text{urine output in a day} + 500\text{ml}$$

The compliance to fluid restriction among hemodialysis patients in Hospital USM will be assessed in this study.

Comorbidities

Conceptual	Presence of multiple health conditions within one person (Harrison et al., 2021).
Operational	The most common of comorbidities among hemodialysis patients are diabetes mellitus, hypertension and hypercholesterolemia.

Diabetes mellitus

Conceptual	Diabetes mellitus is a chronic disease characterized by increase blood glucose which may lead to complications. It is caused by imbalance between insulin supply and insulin demand. There are two types of diabetes mellitus. The most common type of diabetes mellitus for hemodialysis patients is diabetes mellitus type 2 (Regina et al., 2022).
Operational	Diabetes mellitus is measure using blood sugar level with variety of tests such as Glycated hemoglobin (A1C) test, fasting blood sugar test, oral glucose tolerance test and random blood sugar test (Regina et al., 2022).

Hypertension

- Conceptual Hypertension defined as consistent high blood pressure in systemic arteries (Oparil et al., 2018).
- Operational Hypertension is measure by sphygmomanometer. Hypertension is when systolic blood pressure more than 130 mmHg and/or diastolic blood pressure more than 80 mmHg (Iqbal & Jamal, 2022).

Hypercholesterolemia

- Conceptual Hypercholesterolemia is a condition characterized with elevated low density lipoprotein (LDL) cholesterol within the blood. Hypercholesterolemia has highest risk for formation of atherosclerotic plaques (Huff et al., 2022).
- Operational Hypercholesterolemia is diagnosed by lipid profile which consists of total cholesterol, low density lipoprotein (LDL) cholesterol, high density lipoprotein cholesterol and triglycerides (Martinez-Hervas & Ascaso, 2022).

Obesity

Conceptual Obesity is the excessive or abnormal buildup of fat or adipose tissue in the body, which has a negative impact on health which may lead to the risk of diabetes, heart disease, hypertension, and hypercholesterolemia (Panuganti et al., 2022).

Operational Obesity can be measure using body mass index (BMI), skin thickness in triceps, biceps, subscapular and supra iliac areas (Panuganti et al., 2022).

$$\text{Body mass index} = \text{weight (kg)} / \text{height}^2 \text{ (cm)}$$

1.7 Significance of Study

Malaysia ministry of health announced that by 2040, there will be 106,000 patients with chronic kidney disease whom need dialysis. Even worse, 30% of them are age below 45 years old. The statistics of Malaysian having chronic kidney disease is increasing every year (Rohaniza Idris, 2022). Moreover, the death rate of hemodialysis patients is 13.3% where the main cause of death is from cardiovascular disease (Hin et al., 2016). The cardiovascular disease is one of the complications from the incomppliance to fluid restriction which make this study is significance to carry out (Yang et al., 2011).

This study will benefit the healthcare institution with the statistic of patients' compliance to the fluid restriction. The nurses able to give more attention towards health education on fluid restriction to patients. This will allow nurses to plan better intervention for the patients. For example, more health education programs, or talk will be held. This also benefits the hemodialysis patients and their family by providing them awareness, knowledge and support to comply to fluid restriction. Thus, all these interventions will increase their practice of compliance to fluid restriction and quality of life.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter will provide the previous study regarding hemodialysis, interdialytic weight, quality of life and compliance to fluid restriction. This chapter also discusses details about the theoretical and conceptual framework that will be use to guide this study.

2.2 Kidney Disease

Kidney disease is a common disease among Malaysian. It is one of the burden diseases which associated with high morbidity and mortality (Saminathan et al., n.d.-b). End stage renal failure is the 12th leading of mortality in the world which cost 1.2 million life per year (VR & Kaur Kang, 2021b). In March 2022, the Health Minister, Khairy Jamaluddin mentioned there are 40,000 kidney patients in Malaysia. Plus, 8,000 patients are newly diagnosed every year since 2018. This number is expected to increase every year (Nuradzimmah Daim, 2022).

Kidney's main function is for blood filtration and form urine to eliminate waste (Murray & Paolini, 2022). The nephron in kidney plays vital part in glomerular filtration rate (GFR). There are five stage of kidney disease which classify based on the estimated glomerular filtration rate (eGFR) and serum creatinine. Glomerular filtration rate (GFR) will tell how well the kidney filtrate the body blood. Glomerular filtration rate (GFR) is volume of the blood filtered per minute (Ogobuiro & Tuma, 2021a). The normal rate of Glomerular filtration rate (GFR) is 90 to 120ml/min (Gounden et al., 2022).

- i. The first stage of kidney disease is kidney damage with GFR less than 90ml/min.
- ii. The second stage of kidney disease is mild reduction with GFR between 60 to 89 ml/min.

- iii. The third stage of kidney disease is moderate reduction with GFR between 45 to 59 ml/min.
- iv. The third stage of kidney disease is moderate reduction in GFR between 30 to 44 ml/min.
- v. The fourth stage of kidney disease is severe reduction with GFR 15 to 29 ml/min.
- vi. The fifth stage of kidney disease is renal failure with GFR less than 15 ml/min.

The kidney approximately filters 200 liters of fluid every day. The purpose of kidney is to excreted toxins, waste products and excess ions from the blood. The kidney also produces erythropoietin which stimulates production of red blood cells and renin which regulates the blood pressure by using the renin-angiotensin-aldosterone system (Ogobuiro & Tuma, 2021b).

Serum creatinine is an indicator for the health of kidney. Serum creatinine is a waste product comes from muscle activity and used to indicate kidney function. The serum creatinine acquired from a blood test (Gounden et al., 2022). The serum creatinine has inverse relationship with kidney function. High value of serum creatinine indicates slow kidney function. Normal creatinine value is range between 0.7 to 1.2 mg/dl. Serum creatinine is not reliable to someone who has decreased muscle mass such as elderly, amputees and muscle dystrophy (Gounden et al., 2022).

The leading cause of kidney disease is diabetes mellitus. Aside from it, other causes that can lead to kidney disease are hypertension, vascular disease such as renal artery stenosis, urinary tract obstruction, recurrent kidney stone disease and cystic kidney disease (Benjamin & Lappin, 2021).

Latest update 2022 stated that more than 10.6% of world population where more than 800 million people are affected from chronic kidney disease stage 3 to stage 5. It is

more prevalent in older age, women and with morbidity of diabetes mellitus and hypertension. The prevalence of having kidney disease from diabetes mellitus is 24.5% while non-diabetic is 4.9%. The prevalence of having kidney disease from hypertension is 35.8% while non-hypertensive is 10.2% (Kovesdy, 2022).

The kidney disease is a progressive disease which will continue to worsen over time (Benjamin & Lappin, 2021). The damage to the kidney will continue until it reached to the last stage of chronic kidney disease which is the end stage renal failure (ESRF). Once reached the ESRF, the patients will need dialysis.

2.3 Hemodialysis

Hemodialysis is synonym with artificial kidney where it replaces kidney function. Hemodialysis is to ensure a stable internal fluid environment in the body. Hemodialysis is commonly indicated for acute kidney disease and chronic kidney disease especially for the last stage of chronic kidney disease which is end stage renal failure (ESRF) (Murdeshwar & Anjum, 2022).

For more than decades, the session of hemodialysis remained as thrice per week which each session usually takes about minimum 4 hours at the dialysis center (Himmelfarb & Alp Ikizler, 2010). For hemodialysis to carry out, the access for hemodialysis is needed. There are three types of access which are fistula, graft and catheter (National Kidney Foundation, 2015).

The best choice of hemodialysis access is fistula. Fistula is an access which join the artery and vein (National Kidney Foundation, 2015). Fistula is more suitable for a long-term use. A small surgery is needed to accomplish the form of fistula. Moreover, the risk of complication from fistula is lower than graft and catheter. The complications are hospitalization, infections, catheter failure, central venous stenosis and mortality (Marsh et al., 2022).

The process of hemodialysis is where the blood from body will be filter by the dialyzer machine and the cleaned blood will be transport back into the body. The tubes of machine are a semipermeable tubes which allow the diffusion between the particles in unfiltered blood and dialysis fluid to occur (Informed Health, 2018).

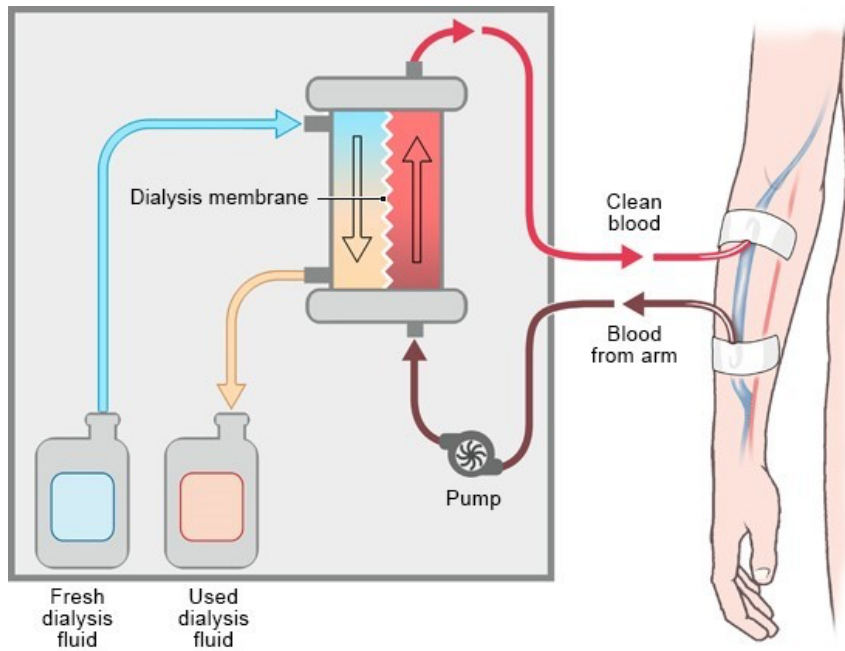


Figure 2. 1 Hemodialysis

The most common complication from hemodialysis are intradialytic hypotension, muscle cramps, nausea vomiting and fever (Murdeswar & Anjum, 2022) (Singh et al., 2015).

A study of worldwide by Ali et al. reported intradialytic hypotension is the highest (25% to 55%) than arrhythmias (50%), nausea vomiting during and after the session (15%), muscle cramps (20%), chest pain (5%) and back pain (5%) (Ali et al., 2021).

A study by Singh et al., in Saudi reported the common complications were hypotension (26.1%), nausea and vomiting (14.2%), fever and chills (14.4%), chest pain and back pain (13.0%), hypertension (10.4%) and headache (10.4%) (Singh et al., 2015).

The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative guidelines in 2005 defined IDH as a decrease in either systolic blood pressure ≥ 20 mmHg or mean arterial pressure (MAP) ≥ 10 mmHg leading to symptoms. IDH usually happen during the last few hours during hemodialysis session (Kanbay et al., 2020). The intradialytic hypotension may due to high ultrafiltration rate, antihypertensive

medication, and poor cardiac reserve. This issue can be managed by proper assessment of dry weight, administering intravenous normal saline and midodrine in refractory cases (Singh et al., 2015).

Nausea and vomiting are mainly due to the intradialytic hypotension. This issue can be managed by preventing the intradialytic hypotension and administering prokinetic agent before the hemodialysis session (Singh et al., 2015). The examples of prokinetic agent are cisapride, metoclopramide and metozolv (Divya Jacob, 2021).

The pathogenesis muscle cramps from hemodialysis is still unknown. The factors such as hypotension, ultrafiltration rate, hypovolemia, low sodium may influence the occurrence of muscle cramps. This issue can be managed by administering 0.9% saline and stretching of the muscle involved (Murdeswar & Anjum, 2022).

The fever and chills are mainly due to infection which may originate from vascular access such as fistula, grafts or catheter. This issue is preventable by using antiseptic technique, hand hygiene, regular disinfection of HD machine and ensure cleanliness of environment (Singh et al., 2015).

2.4 Quality of Life

In 1947, World Health Organization (WHO) defined health as a “state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity”. The “well-being” has established the foundation of quality of life. The quality of life consists of four dimension which are physical health, mental status, social health and functional health (Post, 2014).

In 1975, the quality of life is introduced as key word in medical literature databases. In 1960s, there was only 0 to 1 article per year but now the number of articles had grown big in every search engine. One of the earliest publications is the *Annals of Internal Medicine*. Quoted from the publication is

“What every physician wants for every one of his patients old or young, is not just the absence of death but life with a vibrant quality that we associate with a vigorous youth. This is nothing less than a humanistic biology that is concerned, not with material mechanisms alone, but with the wholeness of human life, with the spiritual quality of life that is unique to man. Just what constitutes this quality of life for a particular patient and the therapeutic pathway to it often is extremely difficult to judge and must lie with the consciousness of the physician” (Elkinton, 1966).

The first QOL measure tool is called Spitzer’s QL-Index which measure concerned of activities, self-care, general health, social support, and outlook on life. Till now, the QOL had growth and develop into different types such as health-related quality of life (HRQOL), world health organization quality of life (WHOQOL), kidney disease quality of life (KDQOL), World Health Organization Quality of Life for Older Adults (WHOQOL-OLD) and etc (Post, 2014).

QUALITY OF LIFE INDEX SCORING FORM		Study No. _____ / _____	<input type="checkbox"/>
		Age _____	<input type="checkbox"/>
		Sex M1 F2 (ring appropriate letter) _____	<input type="checkbox"/>
		Primary Problem or Diagnosis _____	<input type="checkbox"/>
		Secondary Problem or Diagnosis, or complication (if appropriate) _____	<input type="checkbox"/>
		Scorer's Specialty _____	<input type="checkbox"/>
Score each heading 2, 1, or 0 according to your most recent assessment of the patient			
ACTIVITY	<i>During the last week, the patient</i> <ul style="list-style-type: none"> has been working or studying full-time, or nearly so, in usual occupation; or managing own household; or participating in unpaid or voluntary activities whether retired or not2 has been working or studying in usual occupation or managing own household or participating in unpaid or voluntary activities, but requiring major assistance or a significant reduction in hours worked or a sheltered situation or was on sick leave ..1 has not been working or studying in any capacity and not managing own household.....0 		<input type="checkbox"/>
SCORING FORM	<i>During the last week, the patient</i> <ul style="list-style-type: none"> has been self-reliant in eating, washing, toileting and dressing; using public transport or driving own car2 has been requiring assistance (another person or special equipment) for daily activities and transport but performing light tasks1 has not been managing personal care nor light tasks and/or not leaving own home or institution at all0 		<input type="checkbox"/>
HEALTH	<i>During the last week, the patient</i> <ul style="list-style-type: none"> has been appearing to feel well or reporting feeling "great" most of the time2 has been lacking energy or not feeling entirely "up to par" more than just occasionally.....1 has been feeling very ill or "lousy", seeming weak and washed out most of the time or was unconscious.....0 		<input type="checkbox"/>
SUPPORT	<i>During the last week, the patient</i> <ul style="list-style-type: none"> the patient has been having good relationships with others and receiving strong support from at least one family member and/or friend2 support received or perceived has been limited from family and friends and/or by the patient's condition1 support from family and friends occurred infrequently or only when absolutely necessary or patient was unconscious0 		<input type="checkbox"/>
OUTLOOK	<i>During the last week, the patient</i> <ul style="list-style-type: none"> has usually been appearing calm and positive in outlook, accepting and in control of personal circumstances, including surroundings2 has sometimes been troubled because not fully in control of personal circumstances or has been having periods of obvious anxiety or depression1 has been seriously confused or very frightened or consistently anxious and depressed or unconscious0 		<input type="checkbox"/>
QL INDEX TOTAL			<input type="checkbox"/>
How confident are you that your scoring of the preceding dimensions is accurate? Please ring the appropriate category.			
Absolutely Confident 1	Very Confident 2	Quite Confident 3	Not Very Confident 4
			Very Doubtful 5
			Not at all Confident 6
			<input type="checkbox"/>

Figure 2. 2 Spitzer's QL-Index by Spitzer WO, Dobson AJ, Hall J, et al., 1981

Quality of life is a subjective matter which is an essential component in life. In 2022, according to annual report from U.S. News and World Report in partnership with the BAV Group and the Wharton School of the University of Pennsylvania, Sweden has the highest quality of life country in the world with gross domestic products (GDP) of 627 billion and 10.4 million population. On another hand, Malaysia ranked 31 in quality of life with GDP of 373 billion and 32.8 million population. The methodology of the measurement of QOL in the survey is by a good job market, affordable, economically stable, family friendly, income equality, politically stable, safe, well-developed public education system, well-developed public health system (U.S. News Staff, 2022).

2.5 Quality of Life among Hemodialysis Patients

Quality of life act as indicator of lifespan especially for people suffering with illness. Generally, those without illness will have better QOL than those with illness. Hemodialysis patients tend to get complications such as depression, inflammation and malnutrition due to low QOL (Jankowska-Polańska, Uchmanowicz, et al., 2017).

The QOL among hemodialysis patients are mostly in moderate to low level. This data is supported by studies done by Visweswaran et al. (2020), Jankowska-Polańska (2017), Rahdar (2019) and Kang et al. (2015).

Study by Visweswaran et al. in 2020 show end stage renal failure (ESRF) patients who needs dialysis have low QOL. This is due to physiological and psychological changes, fluid restriction, cost of care, increase dependency to other, and negative moods. This study also reported the three biggest determinants of QOL are occupation, income and socio-economic status. Plus, interdialytic weight gain (IDWG) found greatly impact the patients' QOL (Visweswaran et al., 2020a).

Study by Rahdar et al. in 2019 reveal the QOL has association with the compliance to treatment regimens such as hemodialysis visit, medication, dietary and fluid restriction. The higher the patient's compliance with treatment regimens is, the greater the QOL will be (Rahdar et al., 2019a).

A study by Yonata et al. tested the QOL in hemodialysis patients showed a relationship between economic status and quality of life. Also, proved the relationship between number of comorbidities and quality of life. Stable economic status will increase the QOL while high number of comorbidities will decrease the QOL (Yonata et al., 2022a).

A study by Zyoud et al. in Palestine reported factor affecting the QOL among hemodialysis patients are age, female gender, obesity level of education, comorbidities and medications (Zyoud et al., 2016a).

A study by Kang et al. conducted in Korea found age was a significant factor reported significantly better QOL, possibly due to the short duration of disease, and minor complications (Kang et al., 2015a).

Study by Nugroho et al. in Indonesia shows that there was a significant relationship between adherence to fluid restriction with QOL in patients with chronic kidney failure undergoing hemodialysis (Nugroho et al., 2021a).

Study by Liu et al. conducted in Malaysia showed factors influencing the QOL. Female gender has poor QOL than male gender. Religion is one of the factors influencing the QOL where Muslims has better QOL than Buddhist and Christians. Moreover, patients with higher education level have better QOL in psychological domain than uneducated patients. Furthermore, patients who had work had better QOL than unemployed patients plus, higher income show higher QOL (Liu et al., 2014).

In summary, there are many studies done around the world and it presents with overlap factors influencing the QOL among hemodialysis patients such as age, religion, comorbidities, level of education, occupation, socioeconomic status, medication and compliance to fluid restriction.

2.6 Restriction of Fluid

Restriction of fluid is an individual advised to only consume limited volume of water per day. Restriction of fluid indicates for end stage renal failure, renal dialysis, heart failure patients, liver disease such as cirrhosis and hyponatremia. The amount of fluid per day is depending on various factors such as patient's weight, health condition, urine output and etc. All liquids are considered fluid such as water, jelly, yogurts, ice cream, popsicles, gravy, soup, milk and fruit juice (National Health Service, 2018).

Hemodialysis patient has non-functional kidney which cause retention of water and ions such as sodium, potassium and phosphorus. The retention affects the cardiovascular system and cause intradialytic symptoms (Palmer et al., 2015). The risk of mortality and hospitalization are proportionally increasing with the intradialytic weight gain (IDWG). This clearly indicate fluid overload is alarming for ESRF patients (Beerappa & Chandrababu, 2019a).

Patients with restriction of fluid should be aware of clinical manifestation of fluid overload. The clinical manifestations are swelling of extremities such as hands and feet, weight gain, rapid heartbeat, dizziness, weakness, fatigue, shortness of breath and increase blood pressure (Intermountain Healthcare, 2016).