# CHAPTER I

# INTRODUCTION

## 1.1 Background

Chronic Kidney Disease (CKD) is a health problem whose cases are increasing worldwide. CKD is a pathophysiological process with various etiologies that results in a progressive decline in kidney function and generally ends in kidney failure. (Suwitra, 2014). Although global age-standard mortality for most other forms of chronic disease (such as cardiovascular disease (CVD) and cancer) has declined over the past decades, CKD is the third fastest-increasing cause of death globally. It is projected to become the fifth most common cause of death and causes of lost years of life by 2040. (Foreman et al., 2018). The burden of kidney disease varies widely around the world, as does its detection and treatment (Hill et al., 2016).

The prevalence of kidney failure patients is predicted to increase in 2025 in several regions, such as Southeast Asia, the Mediterranean, the Middle East, and Africa. More than 2 million people worldwide receive treatment with dialysis or kidney transplants; only about 10% actually experience this treatment, and a million die every year because they do not have access to treatment (Kemenkes RI., 2017).

According to *World Health Organization* (WHO) in 2018, the incidence of CKD worldwide reached 10% of the population, which is 176 million people worldwide, while CKD patients undergoing hemodialysis (HD) were estimated to reach 1.5 million people worldwide. The incidence is estimated to increase by 8% annually. CKD is a chronic disease with the 20th highest mortality rate in the

world. According to *Riset Kesehatan Dasar* (Riskesdas), in 2018, the prevalence of CKD in Indonesia was 713,783 people, and in East Java province, there were 113,045 people, the second most in Indonesia. The Indonesian Renal Registry (IRR) in 2015 showed that in Indonesia, the number of CKD patients registering for HD units continues to increase by 10% every year. Based on IRR data for 2018, CKD patients undergoing HD increased to 132,142. East Java Province has recorded as many as 9,607 patients undergoing HD. In Banyuwangi, based on the profile data of the Banyuwangi Health Service in 2021, there are 12,918 people with CKD. Blambangan Hospital is a referral hospital for CKD patients for hemodialysis therapy. From the initial data researchers obtained in December 2022 at Blambangan Hospital, 146 active CKD patients were undergoing hemodialysis.

Based on a preliminary study conducted by researchers at Blambangan Banyuwangi Hospital on December 31, 2022, 146 CKD patients were recorded as undergoing hemodialysis therapy in the hemodialysis room, and then researchers took ten samples to measure symptom burden and length of time undergoing hemodialysis in failed patients. Chronic kidney disease undergoing hemodialysis, there were five people undergoing hemodialysis for less than 12 months, having a high symptom burden of 4 people and a low symptom burden of 1 person. Four people underwent hemodialysis for over one year, 2 with high and 2 with low-burden symptoms. One person undergoing hemodialysis for six years has a high symptom burden.

Patients who have experienced CKD cannot be cured, and it has become a big problem, especially the problem of relatively expensive care and treatment

costs. If the patient cannot be cured conservatively, then the patient needs further treatment with hemodialysis (Widowati, 2011). The discovery of uranium in the blood is one of the signs and symptoms of kidney disease, and they need hemodialysis treatment (Wiliyanarti & Muhith, 2019).

Hemodialysis is a method of dialysis therapy that removes fluids and waste products from the body when, acutely or progressively, the kidneys cannot carry out the process. (Muttaqin, 2014). The main goal of HD is to replace kidney function to maintain the human body's homeostasis (Suwitra, 2014). The survival ability of CKD patients undergoing HD is influenced by various factors, such as the severity of the disease experienced, the condition of various body systems disrupted by poisons due to CKD, regulation of fluid and food intake, and adherence to undergoing HD. (Wijayanti et al., 2017).

Steven D. Weisbord's research study in 2016 found that a greater burden of symptoms was reported by patients undergoing dialysis than those not undergoing dialysis (Almutary et al., 2016). Concept analysis of symptom burden and define it as subjective, measurable monitoring, frequency, and severity of symptoms that place a physiological burden on the patient and generate many negative responses, physical and emotional (Gapstur, 2007). The symptom burden of a disease plays a central role in a patient's experience of the disease, and distressing physical and psychological symptoms are one of the main manifestations of CKD. Common symptoms experienced by patients with CKD are fatigue, pruritus, irritability, anxiety, and nausea. Assessment of the symptom burden of all CKD patients is very important in clinical management. However, evidence suggests that healthcare providers often under-recognize and treat the

physical symptoms, with patients experiencing severe physical and physiological trauma (Senanayake et al., 2017). The average patient undergoing hemodialysis was 48 months, a mean of 4 years undergoing hemodialysis. CKD patients undergoing hemodialysis for <1 year had the highest symptom burden, followed by patients with dialysis duration > 10 years (Li et al., 2018). The symptom burden among patients undergoing dialysis has been extensively investigated. Patients undergoing dialysis often experience symptoms simultaneously, which have various attributes (Weisbord et al., 2005).

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 26 of 2019 concerning implementing regulations of Law Number 38 of 2014 about nursing, article 25 verse (1) states that in carrying out their duties as Nursing researchers, Nurses are authorized to conduct research under standards and ethics, using sources resources in Health Service Facilities with the permission of the leadership and using patients as research subjects by professional ethics and provisions of laws and regulations (Kementerian Kesehatan RI., 2019). The severity and complexity of symptom burden among hemodialysis patients underscores the need to incorporate comprehensive symptom assessment into the routine care guidelines and practice of hemodialysis patient management and establish a multidisciplinary team. Based on the identified significant influencing factors, especially first confirmation of self-management, sense of coherence, and social support being important predictors of the overall symptom burden of hemodialysis patients, targeted intervention addressing these factors is recommended to enhance the effect of symptom management ultimately. Furthermore, health policies need to be developed to

support symptom management, such as optimizing reimbursement systems, encouraging public health care professionals to provide emotional management training to patients, and enriching and facilitating patient access to different levels of social resources (Song et al., 2021).

Based on the background above, the researcher is interested in researching the correlation between symptom burden and the long-term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

## 1.2 Formulation of the Problem

Based on the description of the background above, the formulation of the problem in this study is whether there is a correlation between symptom burden and the long-term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

## 1.3 The Objective of the Study

### 1.3.1 General Aim

This study aimed to determine the correlation between symptom burden and long-term hemodialysis treatment among patients with kidney failure at Blambangan Hospital in 2023.

### 1.3.2 Specific Aim

a) Identify long-term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.
b) Identify symptom burden among patients with kidney failure at Blambangan Hospital in 2023.
c) Analyzing the correlation between symptom burden and the long term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

## 1.4 Expected result

### 1.4.1 Theoretical

Increase knowledge, especially in medical surgery, by data showing the correlation between symptom burden and the long term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

### 1.4.2 Practical

**a) For institutions**

This research can increase knowledge in medical surgical courses and be a reference in further research.

**b) For Respondents**

The results of this study provide information and knowledge in CKD patients.

**c) For research sites**

This research can provide information on preventing the correlation between symptom burden and the long-term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

**d) For researcher**

Researchers can add knowledge and insight about the correlation between symptom burden and the long-term to undergo hemodialysis among patients with kidney failure at Blambangan Hospital in 2023.

# CHAPTER II

# LITERATURE REVIEW

## 2.1 Kidney Failure Concept

### 2.1.1 Definition

The kidney is an excretory organ in vertebrates shaped like a bean. In an adult human, the kidney measures about 11 centimetres in length. The kidneys receive blood from a pair of renal arteries, and the blood exits via the renal veins. Each kidney is connected to a ureter, the tube that carries urine to the bladder (Phillip, 2013). Chronic Kidney Disease (CKD) is a failure of kidney function to maintain metabolism and fluid balance due to the progressive destruction of kidney structures with manifestations of accumulation of residual metabolites (toxic uremic) in the blood (Digiulio et al., 2014). Chronic Kidney Disease (CKD) is a clinical syndrome caused by a chronic, progressive, advanced, persistent, and irreversible decline in kidney function (Sudewo, 2013).

### 2.1.2 Renal Failure Classification

Kidney failure is divided into two major parts: acute renal failure (ARF) and chronic kidney failure (chronic renal failure = CRF). In acute kidney failure, there is a sudden decrease in kidney function within a few days or a few weeks and is characterized by the results of kidney function tests (blood urea and creatinine) and increased levels of urea nitrogen in the blood. Meanwhile, in chronic kidney failure, the decline in kidney function occurs slowly. Decreasing kidney function can continue for months or years until the kidneys cannot function (end-stage renal disease). Chronic kidney failure is divided into five stages based

on the glomerular filtration rate (GFR), as shown in the table below. Normal GFR is 90 - 120 mL/min/1.73 m2

**Table 2.1.** Stadium CKD (TRA, 2013)

| Stadium | GFR (ml/min/1.73m$^2$) | Description |
|---|---|---|
| 1 | 90 – 120 | Minimal damage to the kidneys, filtration is still normal or slightly increased. |
| 2 | 60 – 89 | Kidney function is slightly decreased |
| 3 | 30 – 59 | Moderate decline in kidney function |
| 4 | 15 – 29 | Severe decline in kidney function |
| 5 | Less from 15 | End Stage Renal Disease |

To assess GFR (Glomerular Filtration Rate) / CCT (Clearance Creatinine Test) can be used with the formula:

Clearance creatinine (ml/ min) = $\frac{(140-age)\ x\ body\ weight\ (kg)}{72\ x\ creatinine\ serum}$

In women the results are multiplied by 0.85

### 2.1.3 Renal Failure Aetiology

The causes of acute kidney failure can be divided into three major groups, namely:

1) Prerenal causes the reduction of blood flow to the kidneys that can be caused by:
    a. For example, Hypovolemia (low blood volume) due to heavy bleeding.
    b. Dehydration due to lack of fluid intake.

c. Drugs, such as diuretic drugs, cause excessive fluid expenditure in urine.
d. Blockages in the blood vessels of the kidneys cause impaired blood flow to the kidneys.
e. Rhabdomyolysis: the occurrence of muscle breakdown causing damaged muscle fibres to clog the kidney's filtration system that can occur due to trauma or severe burns.

2) Renal causes where damage occurs to the kidneys.
   a. Sepsis: The body's immune system is overactive because of an infection that causes inflammation and damages the kidneys.
   b. Drugs that are toxic to the kidneys.
   c. Rhabdomyolysis: the occurrence of muscle breakdown causing damaged muscle fibers to clog the kidney's filtration system that can occur due to trauma or severe burns.
   d. Multiple myeloma.
   e. Acute inflammation of the glomeruli, systemic lupus erythematosus, Wegener's granulomatosis, and Goodpasture syndrome.
3) Postrenal causes, in which the flow of urine from the kidneys is interrupted.
   a. Blockage of the urinary tract (ureter or bladder) causes the reverse urine flow to the kidneys. If the pressure increases, it can cause kidney damage, and the kidneys will no longer function.
   b. Enlarged prostate or prostate cancer can block the urethra (part of the urinary tract) and prevent bladder emptying.
   c. Tumours in the abdomen that press on and block the ureter.

d. Kidney stones.

4) Causes of chronic kidney disease include:

a. Diabetes mellitus type 1 and type 2 are uncontrolled and cause diabetic nephropathy.

b. Uncontrolled high blood pressure.

c. Inflammation and damage to the glomeruli (glomerulonephritis), for example, due to lupus or post-infection.

d. Long-term use of certain drugs or drugs that are toxic to the kidneys.

e. Clogged and hardened arteries (atherosclerosis) cause reduced blood flow to the kidneys, causing kidney cells to become damaged (ischemia).

f. HIV infection, heroin use, amyloidosis, chronic kidney infection, and various kidney malignancies (Phillip, 2013)

### 2.1.4 Pathophysiology of Renal Failure

1) Acute kidney failure is divided into two levels:

1) Initial phase

Characterized by the narrowing of the renal blood vessels and decreased renal blood flow, hypoperfusion results in renal tubular ischemia. Renal vasoconstrictor mediators may be the same as the neurohormonal agents that regulate renal blood flow under normal circumstances: the sympathetic nervous system, the renin-angiotensin system, renal prostaglandins, and atrial natriuretic factors. As a result

of decreased renal blood flow, it will be followed by a decrease in glomerular filtration (Nursalam & Fransisca, 2014).

2) Maintenance phase

In this phase, tubular obstruction occurs due to tubular cell swelling and accumulation of debris. Once the phase continues, kidney function will not return to normal even if blood flow returns. Active renal vasoconstriction is the capture point of the pathogenesis of renal failure and is sufficient to impair the kidney's excretory function. Various mediators of renal blood flow appear to be involved. Decreased cardiac output and hypovolemia are common causes of perioperative oliguria. Decreased urine activates the sympathetic nervous system and the renin-angiotensin system. Angiotensin is a vasoconstrictor of the renal blood vessels and causes decreased renal blood flow

2) Chronic kidney disease

In chronic kidney failure, many nephrons are damaged, so the existing nephrons cannot function normally. Under normal circumstances, a third of the number of nephrons can eliminate several waste products in the body to prevent them from accumulating in body fluids. However, each subsequent loss of nephrons will lead to the retention of waste products and potassium ions. If the nephron damage is progressive, the urine gravity is around 1.008. Chronic renal failure is almost always associated with severe anaemia (Nursalam & Fransisca, 2014).

Fluid and sodium retention can result in oedema, CHF, and hypertension. Hypotension can occur due to the activity of the renin-

angiotensin axis, and their joint action increases aldosterone secretion. Salt loss results in a risk of hypotension and hypovolemia. Vomiting and diarrheal cause water and sodium separation, so the uremic status worsens (Nursalam & Fransisca, 2014).

Metabolic acidosis is due to the kidney's inability to secrete excess acid ($H^+$). Decreased acid secretion due to renal tubules' inability to secrete ammonia and absorb sodium bicarbonate (HCO3). Decreased excretion of phosphate and other organic acids occurs (Nursalam & Fransisca, 2014)

Anemia results from inadequate production of erythropoietin, shortening of red blood cell life, nutritional deficiencies, and a tendency to bleed due to the patient's uremic status, especially from the gastrointestinal tract. Erythropoietin, produced by the kidneys, stimulates the bone marrow to produce red blood cells, and the production of erythropoietin decreases, resulting in severe anemia accompanied by fatigue, angina, and shortness of breath (Nursalam & Fransisca, 2014).

In chronic kidney failure, the average glomerular filtration rate decreases, and water and sodium retention occurs, which is often associated with hypertension. Hypertension will continue if one part of the kidney experiences ischemia. The ischemic kidney tissue secretes large amounts of renin, which forms angiotensin II, so vasoconstriction and hypertension occur (Nursalam & Fransisca, 2014).

### 2.1.5 Chronic Kidney Disease Clinical Manifestations

In Chronic Kidney Disease, every body system is affected by uremia, and the patient will show several signs and symptoms. The severity of signs and symptoms depends on the site, extent of damage, and other underlying conditions. Manifestations that occur in Chronic Kidney Disease, among others, occur in the cardiovascular system, dermatology, gastro-intestinal, neurological, pulmonary, musculoskeletal, and psycho-social according to (C. L. T. Chang et al., 2013) is :

1) Cardiovascular:
    a) Hypertension, which results from fluid and sodium retention from the activity of the renin-angiotensin-aldosterone system.
    b) Congestive heart failure.
    c) Pulmonary oedema, due to excess fluid.
2) Dermatology such as Pruritus, which is the buildup of urea in the skin layer.
3) Gastrointestinal such as anorexia or loss of appetite, nausea to the occurrence of vomiting.
4) Neuromuscular such as changes in the level of consciousness, unable to concentrate, muscle twitches to spasms.
5) Pulmonary such as the presence of thick and clay sputum, shallow breathing, chasmal, to the occurrence of pulmonary oedema.
6) Musculoskeletal such as fractures due to calcium deficiency and bone loss due to disruption of the dihydroxy hormone ferroan collection.

7) Psychosocial such as a decrease in the level of self-confidence to low self-esteem, anxiety about illness and death.

### 2.1.6 Diagnostic Examination of Chronis Kidney Disease

According to Carey et al (2016) in the research they conducted found that diagnostic tests in the laboratory include (Carey et al., 2016) :

1) Laboratory:
   a) Blood Sedimentation Rate: Increased which is exacerbated by the presence of anaemia and hypoalbuminemia. Normochromic normocytic anaemia and low reticulocyte count.
   b) Arterial Blood Gas: pH less than 7.2 (normal 7.38-7.44)
   c) Potassium: increased (normal 3.55-5.55 mEq/L)
   d) Magnesium / phosphate: increased (normal 1.0-2.5 mg, dl)
   e) Calcium: decreased (normal 9-11 mg/dl)
   f) Protein: (especially albumin): decreased (normal 4-5.2 g/dl)
   g) Urea and creatinine: Elevated, usually the ratio between urea and creatinine is approximately 20 : 1. The ratio is increased due to gastrointestinal bleeding, fever, extensive burns, steroid treatment, and urinary tract obstruction. This ratio is reduced when urea is less than creatinine, on a low-protein diet, and the creatinine clearance test is decreased.

      Normal value:

      Male: 97 - 137 mL/minute/1.73 m3 or 0.93 - 1.32 mL/second/m2

      Female: 88 - 128 mL/minute/1.73 m3 or 0.85 - 1.23 mL/second/m2
   h) Hyponatremia: Usually due to excess fluid.

i) Hiperkalemia: usually occurs in advanced renal failure along with decreased dieresis.

j) Hypocalcaemia and hyperphosphatemia: occurs due to reduced synthesis of vitamin D3 in Chronic Kidney Disease.

k) Phosphate alkaline: elevated due to disorders of bone metabolism, especially bone leachate phosphatase isoenzymes.

l) Hypoalbuminemia and hypocholesterolemia: generally caused by metabolic disorders and low protein diets.

m) Increased blood sugar, due to disturbances of carbohydrate metabolism in renal failure (resistance to the effects of insulin on peripheral tissues).

n) Hyper triglycerides, due to disturbances in fat metabolism, are caused by an increase in the hormone insulin and a decrease in lipoprotein lipase.

o) Metabolic acidosis with respiratory compensation shows decreased pH, decreased BE, decreased $HCO_3$, decreased $PCO_2$, all due to retention of organic acids in kidney failure.

p) Radiology: Plain photo of the abdomen to assess the shape and size of the kidneys (the presence of stones or the presence of an obstruction). Dehydration due to the diagnostic process will worsen the condition of the kidneys, therefore patients are expected not too fast.

q) Intra Venous Pyelography (IVP) To assess the pelvically system and ureters.

r) Ultrasound: To assess the size and shape of the kidneys, thickness of the renal parenchyma, density of the renal parenchyma, anatomy of the pelvically system, proximal ureters, bladder and prostate.

s) EKG: To see the possibility of left ventricular hypertrophy, signs of pericarditis, arrhythmias, electrolyte disturbances (hyperkalaemia).

### 2.1.7 Complications of Chronic Kidney Disease

Like other chronic and long-standing illnesses, people with chronic kidney disease will experience several complications. Complications of Chronic Kidney Disease according to Smeltzer and Bare (2012) include:

1) Hypokalaemia due to decreased secretion of metabolic acidosis, catabolism, and excessive dietary intake.
2) Pericarditis, pericardial effusion, and cardiac tamponade due to retention of uremic waste products and inadequate dialysis.
3) Hypertension due to fluid and sodium retention and malfunction of the renin-angiotensin-aldosterone system.
4) Anaemia due to decreased erythropoietin.
5) Bone disease and metabolic classification due to phosphate retention, low serum potassium levels, abnormal vitamin D metabolism and increased aluminium levels due to increased nitrogen and inorganic ions.
6) Uremia due to increased levels of urea in the body.
7) Heart failure due to excessive increase in cardiac work.
8) Malnutrition due to anorexia, nausea and vomiting.
9) Hyperparathyroidism, hyperkalaemia and hyperphosphatemia.

In CKD, symptom burden is better understood as a multidimensional aspect of a wide range of physical and psychological symptoms. Fatigue, pain, and sexual dysfunction contribute greatly to the burden of symptoms,

and these symptoms are often underrecognized and require routine assessment (Almutary et al., 2016)

### 2.1.8 Management of Chronic Kidney Disease

Nursing management of patients with CKD is divided into three, namely:

1) Conservative
    a. Blood and urine lab tests were carried out
    b. Observation of fluid balance
    c. Observe for oedema
    d. Limit incoming fluids
    e. Low uraemia diet
2) Medications: diuretics, antihypertensives, iron supplements, phosphate binding agents, calcium supplements, furosemide.
3) Operative
    a. Collection of kidney stones
    b. Kidney transplant (Nursalam & Fransisca, 2014)
4) Dialysis
    a. Peritoneal dialysis

        Usually done in emergency cases. While dialysis that can be done anywhere that is not acute is CAPD (Continues Ambulatory Peritoneal Dialysis).

    b. Haemodialysis

        Haemodialysis (HD) is a kidney replacement therapy that is carried out by flowing blood into an artificial kidney tube (dialyser) which aims to eliminate remnants of protein metabolism and correct electrolyte

balance disturbances between the blood compartment and the dialysate compartment through a semipermeable membrane (Silviani, 2011)

However, the prolonged dialysis process, and due to the high dependence of chronic kidney failure patients on haemodialysis, actually has quite a negative impact on patients, including:

a) Financial Impact

We cannot deny that finance is the most important thing if we want treatment. Where patients with chronic kidney failure who are very dependent on haemodialysis must undergo haemodialysis every week or month. So that it will take a lot of money to meet the needs of haemodialysis patients.

b) Productivity Impact

Patients with chronic kidney failure besides experiencing dependence on haemodialysis, patients will also experience changes in their physique and body condition. Patients with chronic kidney failure will tend to feel tired quickly if they do quite heavy work, so that it will affect the level of productivity of the sufferer.

c) Psychological Impact

In addition to the long course of the disease, the patient's disability and feelings of discomfort caused by depending on the haemodialysis machine are often a source of despair that leads to psychological obstacles, including:

1) Sleep disorders
2) Delirium

Delirium is a medical condition characterized by difficulty concentrating and impaired intelligence to confusion accompanied by lethargy. Delirium in conditions of kidney failure is associated with failure of the kidneys to remove toxic metabolites from the body through the urinary tract.

d) Disequilibrium Syndrome

This condition arises due to osmotic imbalance and rapid changes in blood pH, which triggers symptoms such as headaches, nausea, muscle cramps, irritability, agitation, drowsiness and sometimes seizures. This condition usually occurs in patients who are undergoing haemodialysis for the first time. This condition usually occurs immediately after haemodialysis, but can improve soon if proper treatment is given.

e) Apprehensive

The condition of kidney failure which is usually accompanied by haemodialysis is a very uncomfortable condition. The fact that patients with kidney failure, especially chronic kidney failure who cannot be separated from haemodialysis throughout their life, creates a psychological impact in the form of great anxiety (Silviani, 2011).

## 2.2 Haemodialysis

### 2.2.1 Definition of Haemodialysis

Haemodialysis comes from the words hemo (blood) and dialysis (separation or filtration). Haemodialysis means the process of cleaning the blood from waste substances through a filtering process outside the body. Haemodialysis using a dialysis machine artificial kidney. Haemodialysis is known in layman with the term dialysis. (Yasmara, 2016).

The dialyzer, or filter, has two parts, one for the blood and one for the washing fluid, which is called the dialysate. A thin membrane separates these two parts. Blood cells, proteins and other important things remain in the blood because their molecular size is too large to pass through the membranes, while the smaller waste products in the blood (such as urea, creatinine, potassium and excess fluid) can pass through the membranes and be excreted (Yasmara, 2016).

Haemodialysis is a method to remove excess fluid and toxins when the patient's blood circulates through an artificial kidney (dialysis device/dialyzer). The process of diffusion moves solutes (e.g. excess potassium) from the blood across a semipermeable membrane (dialysis device filter) into the dialysate for excretion from the body (Hurst M, 2016).

Haemodialysis is a high technology as a replacement therapy to remove metabolic wastes or certain toxins from the human blood circulation such as water, sodium, potassium, hydrogen, urea, creatinine, uric acid, and other substances through a semi-permeable membrane that separates blood and dialysate fluid in an artificial kidney where diffusion, osmosis and ultra-filtration processes occur (Smeltzer & Bare, 2018).

### 2.2.2 Haemodialysis Purposes

According to (Hurst M, 2015) the purpose of doing haemodialysis is as follows:

1) Correcting fluid and electrolyte imbalances.
2) Removes toxins and metabolic waste products.
3) Control blood pressure
4) To get rid of the products of protein metabolism, namely urea, creatinine and uric acid.
5) Get rid of excess water in the body.
6) Repair and maintain the body's buffer system and electrolyte levels.
7) Improving the patient's health status.

### 2.2.3 Haemodialysis indications.

According to Yasmara D, (2016) haemodialysis needs to be done if the kidneys are no longer able to remove enough waste and fluids from the blood to keep the body healthy. This usually occurs when kidney function is only 10-15%. Clients may experience several symptoms, such as nausea, vomiting, swelling and fatigue. However, if the client does not experience these symptoms, the level of waste in the blood is still high and may be toxic to the body, the doctor will tell when dialysis should be started.

There are a number of indications for dialysis to be performed in patients with acute renal failure or end-stage renal disease. These indications include pericarditis or pleuritis (urgent indication), uremic encephalopathy or progressive neuropathy (with signs such as confusion, asterixis, tremor, multifocal myoclonus, wrist or ankle weakness or in severe cases seizures

(urgent indication), a have diathesis bleeding unresponsive to antihypertensive drugs and persistent metabolic disorders that are difficult to treat with medical therapy (such as hyperkalaemia, metabolic acidosis, hypercalcemia, hypocalcaemia, hyperphosphatemia, persistent nausea and vomiting, BUN >40 mmol/a litre, creatinine >900). Usually, dialysis is started in adult patients with chronic kidney disease when the filtration rate decreases to about 10 mL/min/1.73 $m^2$.

Indications for effective haemodialysis in patients are glomerular filtration rates (GFR) of 5 and 8 mL/min/1.73 $m^2$, nausea, anorexia, vomiting and/or asthenia, and spontaneously decreased protein intake <0.7 g/kg. /a day.

### 2.2.4 Haemodialysis Contraindications

According to Yasmara D, (2016) the contraindications for haemodialysis patients are as follows:

1) Patients with very serious bleeding with anaemia.
2) Patients experiencing severe hypotension or shock.
3) Patients with coronary heart disease, serious or myocardial insufficiency, serious arrhythmias, severe hypertension or cerebrovascular disease.
4) Major postoperative patient, 3 days postoperatively.
5) Patients with serious bleeding conditions or anaemia.
6) Patients with mental disorders or malignant tumours.
7) Cerebral haemorrhage due to hypertension and anti-clotting.
8) Subdural hematoma.
9) Late-stage uraemia with serious irreversible complications.

### 2.2.5 Haemodialysis Process

According to (Smeltzer & Bare, 2013) in haemodialysis activities there are 3 main processes, namely as follows :

1) Diffusion Process

   In the diffusion process, dissolved materials will move to the dialysate due to differences in levels in the blood and in the dialysate. The higher the difference in levels in the blood, the more material is transferred into the dialysate.

2) Ultrafiltration Process

   Ultrafiltration process is the process of moving water and dissolved materials due to differences in hydrostatic pressure in the blood and dialysate.

3) Osmosis Process

   The process of osmosis is the process of moving water due to chemical energy, namely the difference in blood osmolarity and dialysis.

### 2.2.6 Haemodialysis Duration

According to Hurst M, (2015) haemodialysis for chronic kidney failure, is usually programmed two to three times a week. Frequency depends on the amount of kidney function remaining, but most patients undergo dialysis 3 times/week. The dialysis program is said to be successful if the patient returns to a normal life, the patient returns to a normal diet, the red blood cell count is tolerable, the blood pressure is normal and there is no progressive nerve damage (Smeltzer & Bare, 2018).

The duration of haemodialysis is closely related to the efficiency and adequacy of haemodialysis, so that the duration of haemodialysis is also influenced by the level of uraemia due to the progressive deterioration of kidney function and comorbid factors, as well as blood flow rate and dialysate flow rate. The longer the haemodialysis process, the longer the blood is outside the body, so that more anticoagulants are needed, with the consequence of frequent side effects (Rahman et al., 2016).

Dialysis can be used as long-term therapy for chronic kidney failure or as a temporary therapy before the patient undergoes a kidney transplant. In acute kidney failure, dialysis is done for only a few days or a few weeks, until kidney function returns to normal (Smeltzer & Bare, 2018). The longer the haemodialysis process, the longer the blood is outside the body, so that more anticoagulants are needed, with the consequence of frequent side effects.

In a study conducted by Almutary et al, found that the average CKD patient undergoing haemodialysis was 48 months, which means 4 years undergoing haemodialysis. CKD patients undergoing haemodialysis for <1 year had the highest symptom burden followed by patients with dialysis duration >10 years (Li et al., 2018).

### 2.2.7 Symptom of Haemodialysis

1) Physical Symptom

According to research conducted by Yu, et al (2012) symptoms in patients undergoing haemodialysis are divided into 4 clusters, including :

a) *Energy and Sensory Discomfort* Symptom Cluster

a. Tiredness

b. dry mouth

c. muscle weakness

d. lack of vitality

Energy and sensory discomfort may be related to anaemia, which is frequently seen in HD patients, caused by insufficient erythropoietin, inhibited erythropoiesis, decreased red cell lifespan, or blood loss during haemodialysis (Yu et al., 2012).

b) *GI and cardiac–pulmonary* Symptom Cluster

a. Chest tightness

b. Chest pain

c. Nausea

d. Vomiting

Haemodialysis patients often experience vomiting and nausea which may be caused by various influences such as insufficient dialysis, drug side effects, and abnormal BUN levels (Tseng & Lin, 2008).

c) *Cardiovascular* Symptom Cluster

a. Headache

b. Vertigo

c. Dyspnoea

d. Shortness of breath

Abnormal blood pressure among haemodialysis patients is very high, and headaches and vertigo may be due to secondary hypertension or orthostatic hypotension (Yu et al., 2012).

d) *Electrolyte Imbalance* Symptom Cluster

a. Joint pain

b. Arrhythmia

c. Numbness

Potassium ions play an important role in biological mechanisms. It controls nerve impulse conduction and repolarization. When the potassium ion concentration is abnormal, the patient may experience symptoms of numbness, joint-muscle pain, and arrhythmia (Polaski & Tatro, 1996).

2) Emotional Symptom

In a study conducted by Al Naamani et al. in 2021, emotional symptoms in haemodialysis patients include:

a) Fatigue

b) Anxiety

c) Depression

d) Sleep Problem

Overall, fatigue, anxiety, depression and sleep quality are significant problems for patients undergoing haemodialysis (Al Naamani et al., 2021).

### 2.2.8 Haemodialysis Complications

Patients with chronic kidney disease on haemodialysis therapy are more likely to experience changes in their behaviour and poor quality of life and can cause other complications. One of the hypotheses for changes in cognitive function in patients with chronic renal failure is an increase in the

synthesis of pro-inflammatory mediators. Higher levels of pro-inflammatory cytokines and other inflammatory mediators have been considered as potential agents contributing to a reduction in quality of life in patients with chronic renal failure who are on dialysis. It is common for patients in this clinical setting to have this endotoxemia, further exacerbating renal dysfunction. Patients undergoing dialysis may cause a progressive decline in their cognitive and intellectual levels, altered nutrition, a higher tendency to develop infections, and a worsening quality of life, despite the described improvement in clinical and laboratory conditions. Inflammatory mediators during haemodialysis treatment may be indicated as aggravating factors for increased morbidity, mortality, and subjective decrease in perceived quality of life.

1) Physical Complications of Haemodialysis

a) Cardiovascular System

There are complications in patients undergoing haemodialysis therapy due to changes in the body in the cardiovascular system which include heart failure and pulmonary oedema. This problem is caused by fluid retention that continues to accumulate in the abdomen, lungs and extremities, so that the fluid in the lungs will press towards the heart and inhibit the work of the heart, this causes inadequate blood flow to the heart muscle which is the beginning of failure. congestive heart (Warhamna & Husna, 2018).

b) Acute Complications

Acute complications of haemodialysis are complications that occur during haemodialysis. Complications that often occur include

hypotension, muscle cramps, nausea and vomiting, headache, chest pain, back pain, itching, fever, and chills (Bieber & Himmelfarb, 2013). The types of complications and their causes are as follows:

a. Hypotension caused by excessive fluid withdrawal, antihypertensive therapy, cardiac infarction, tamponade, anaphylactic reactions.
b. Hypertension caused by excess sodium and water, inadequate ultrafiltration.
c. Allergic reactions include allergic reactions, dialysers, tubes, heparin, iron, latex
d. Arrhythmias caused by electrolyte disturbances, fluid shifts that are too fast, dialyzed antiarrhythmic drugs.
e. Muscle cramps due to Ultrafiltration too fast, electrolyte disturbances
f. Air embolism where this complication occurs due to air entering blood circuit
g. Dialysis disequilibrium which is a transfer of osmosis between intracellular and extracellular causes cells to become swollen, cerebral oedema. Rapid decrease in plasma urea concentration
h. Chlorine which is Haemolysis due to decreased column charcoal
i. Fluoride contamination which causes itching, irritation Gastrointestinal, syncope, tetanus, neurological symptoms, arrhythmias.
j. Bacterial/endotoxin contamination that causes fever, chills, hypotension due to contamination from the dialysate and water circuit.

2) Social Complications of Haemodialysis

The exact causes of depression are unknown, but factors related to these causes, such as social factors, have four categories that have the potential to cause depression, namely: stress, feelings of helplessness and loss of hope, extreme defences against stress, and the influence of interpersonal relationships from affective disorders. Psychosocial factors that may influence depression include life events and environmental stressors, personality, psychodynamics, repeated failures, cognitive theory and social support. Clinicians believe that life events play a major role in depression, that life events and environmental stressors cause stress, more frequently preceding the first episode of a mood disorder than later episodes (Kaplan & Sadock, 2010).

Patients undergoing haemodialysis experience psychosocial problems, activity limitations, fluid restrictions which can cause depression. Depression can arise in new patients undergoing haemodialysis where in the first year of starting haemodialysis therapy this is caused by changes in the patient's lifestyle, problems losing a job, changing roles in the family, changing social relationships and time wasted on dialysis (Baydoğan & Dağ, 2008)

3) Haemodialysis Psychological Complications

   a. Delirium

      Delirium is a medical condition characterized by difficulty concentrating during activities and impaired intelligence to confusion accompanied by lethargy. Delirium is a condition of kidney failure associated with failure of the kidneys to remove toxic metabolites

from the body through the urinary tract. This complication is caused by increased levels of urea in the blood (uraemia), anaemia and hyperparathyroidism. This condition can also occur along with an increase in diabetes patients receiving dialysis due to kidney dysfunction. Complications of delirium are usually haemodialysis or dialysis; the patient's cognitive impairment will return to normal as before. But there are times when some of these conditions also persist.

b. Depression

Depression is a psychiatric condition that is most often found in patients with kidney failure. Depression is related to a person's psychological condition. The prevalence of major depression in the general population is around 1.1 - 15% in men and 1.8 - 23% in women, so it can be said that women are more prone to depression than men. However, in haemodialysis patients, the prevalence is around 20-30%, it can even reach 47%. Therefore, the condition of kidney failure, which is usually accompanied by haemodialysis, is a very uncomfortable condition. In this case, the fact that patients with kidney failure, especially chronic kidney failure who cannot be separated from haemodialysis throughout their lives, will certainly have a great psychological impact.

It was reported that this type of complication was caused by the loss of something that previously existed, such as freedom, work and independence, which are things that are felt by kidney failure patients

undergoing haemodialysis. This can cause real depressive symptoms in patients with kidney failure to commit suicide.

Depression is a type of complication that requires haemodialysis treatment because it is the most common type of mental disorder found in kidney failure patients undergoing haemodialysis (Hedayati et al., 2009). In this case, haemodialysis procedures and treatments can be carried out 3 times a week causing changes in the patient's status and personality. These changes result from continuous stressful situations that can cause personal, social and environmental changes. the need to change lifestyle habits, dependence on haemodialysis procedures and medical staff, loss of job and social position, reduced financial status, dietary regimes, sexual dysfunction, problems related to access to dialysis, and concerns about mortality, but the psychotic response in haemodialysis patients depends on personality premorbid, social support from family and other comorbidities.

c. Disequilibrium Syndrome

This disorder usually occurs in haemodialysis patients for 3-4 hours after haemodialysis, but can also occur 8-48 hours afterward. This occurs due to osmotic imbalance and rapid changes in blood pH, triggering symptoms such as headaches, nausea, muscle cramps, irritability, agitation, drowsiness and sometimes seizures. Psychotic symptoms may also occur. in patients undergoing haemodialysis for the first time. This condition occurs after haemodialysis, but can soon improve if proper treatment is given. The use of small doses of

antipsychotic drugs is given to patients to treat psychotic symptoms that arise due to this condition.

## 2.3 Symptom Burden

### 2.3.1 Definition Symptom Burden

The symptom burden concept first purposed by (Desbiens et al., 1999) it was described as the sum of the frequency, severity, duration and distress of symptoms experienced by patients in a study of 1582 patients with chronic disease. Symptom burden is defined as the subjective, measurable prevalence, frequency, and severity of symptoms that place a physiological burden on a patient and cause some negative physical or emotional patient response (Gapstur, 2007). Likewise, symptom distress can be another similar concept found in the literature. The medical literature identifies symptom burden in a variety of chronic disease settings; focuses on quantification, severity, and frequency of symptoms; recognize the potential aetiology underlying the disease; explored its multidimensional attributes, and demonstrated that symptom burden is a predictor of survival in patients with chronic disease (Gapstur, 2007).

Based on a literature review by Gapstur (2007) distinguishes to be dynamic related to the development of the disease, symptoms are more or less frequent, and for the degree of severity depending on the causative factor or disease. Furthermore, multidimensional, as conceptual with the dimensions of symptom prevalence, frequency, and intensity. Quantitative, measurement of symptom burden and associated with the total symptom burden using a

specific symptom checklist. Physiological symptoms indicate changes in the normal physical function of the human body. Symptomatic burden should be measured subjectively by self-report of the patient which is necessary to clearly define symptom burden for the continued advancement of science (Gapstur, 2007).

### 2.3.2 Factors Associated with Symptom Burden

There is limited research investigating factors associated with symptom burden. However, few studies have assessed the relationship between symptom burden and demographic variables. There were statistically significant differences in the sample characteristics, but the relationship was not clearly explained (Zambroski et al., 2005). Marital status can affect symptom burden, reporting that patients with partners have better coping skills, self-esteem and more support than patients without partners who face symptom burden (Johansson et al., 2006).

Women have a positive relationship with symptom severity than men, because women have more problems with disease symptoms, energy and emotions (Steptoe et al., 2000). Younger patients had more troublesome symptoms than older, relating to the amount of symptoms experienced and symptom severity and greater symptom burden (Zambroski et al., 2005). In the study by Xu and colleagues, demographic differences including religion, race and education may have had sampling bias, and they suggested that further studies could examine the relationship between these demographic variables and symptom burden (Xu et al., 2015). A greater burden of

symptoms is reported by patients on haemodialysis than patients who are not on haemodialysis (Almutary et al., 2016).

### 2.3.3 Assessment tools for symptom burden amongst patients undergoing dialysis

**1) ESAS**

ESAS, discovered by Bruera et al. in 1991, has been used as a clinical tool to assess the severity of nine symptoms experienced by patients with advanced cancer. Patients were asked to rate the severity of each of their current symptoms on a visual analogue scale of 0 (absent) to 10 (very severe) (Watanabe et al., 2011). In 2006, Davison et al. modified the ESAS in 507 patients undergoing dialysis by adding a 10th item (pruritus) and reported that the overall symptom pressure score was very strong is correlated with the symptom/problem list of KDQOL-SF™ ($r = -0.69$, $P < 0.01$). They also indicated that the content validity and test–retest reliability ($r = 0.70$) of the modified ESAS are favourable to this dialysis population (Davison et al., 2006). The modified ESAS is sensitive to fluctuations in symptom severity among patients on dialysis because it measures current symptoms.

**2) MSAS-SF**

This assessment tool developed by Portenoy et al., in 1994 and simplified by Chang in 2000, the MSAS-SF was designed to examine the presence, frequency and severity of symptoms in patients with cancer during their last week (Portenoy et al., 1994). t is composed of 32 items that evaluates the presence (Y/N) and distress of 28 physical symptoms (5-

point Likert scale, 0 = not at all bothersome to 4 = very much bothersome) and the presence and frequency of 4 psychological symptoms (4-point Likert scale, 1 = rarely to 4 = almost constantly). Previous studies confirmed the reliability and validity of MSAS-SF in patients with cancer (V. T. Chang et al., 2000). Weisbord et al. also used the MSAS-SF to measure symptoms among patients on dialysis but did not report its psychometric properties. Some common symptoms, such as muscle cramps and restless legs, among patients on dialysis were excluded from the scale, thereby possibly understating the symptom burden among patients on dialysis (Weisbord et al., 2003).

**3) KDQOL-SF™**

KDQOL-SF™, developed by RABD Corporation in 1995, is a reliable and validated tool to measure the quality of life of patients with kidney disease in their last four weeks (Hays et al., 1997). This scale consists of 80 items related to health-related quality of life specifically kidney disease and the Short Form 36 (SF-36). Joshi et al. obtained an acceptable level of validity and reliability and confirmed through exploratory factor analysis that the eight factors/subscales of 36 general health items accounted for 68.4% of the variance and the overall health rating correlated positively with the kidney disease target scale (Joshi et al., 2010). All of the subscales of KDQOL-SF™ except social function (0.66) have Cronbach's α coefficients above 0.7 to indicate good reliability. Symptom/problem list, 1 of the 11 scales in the kidney disease-specific part of the KDQOL-SF™, consists of 12 separate symptoms.

Patients are asked to rate how distressed they are by each symptom on a 5-point Likert scale ranging from 1 (not at all bothersome) to 5 (very bothersome). The symptom/problem list of The KDQOL-SF™ has been used extensively to assess symptoms among patients undergoing dialysis (Amro et al., 2014). However, the scale only consisted of 12 symptom items and failed to cover common symptoms, such as fatigue and psychological problems, among patients on dialysis. The recall period of the scale is relatively long and consequently may result in response bias.

**4) POSs**

In 1999, Hearn and Higginson developed the original POS to assess the presence and distress of 15 symptoms in patients with advanced cancer over the last 3 days (Hearn & Higginson, 1999). In 2009, Murphy et al. modified POSs in patients with advanced kidney disease by adding two symptoms specific to kidney disease (itching and restless legs) and to formulate 17-item POSs-renal. Each symptom is scored on a 5-point Likert scale ranging from 1 (not at all bothersome) to 5 (very bothersome), and the questionnaire provides an open field to give patients the opportunity to exhibit other symptoms not included in the scale. POSs-renal have been used extensively for patients on dialysis, but studies have not established their reliability or validity (Murphy et al., 2009).

**5) Dialysis Symptom Index (DSI)**

The Dialysis Symptom Index (DSI) was used to assess dialysis symptom burden by calculating the presence and the severity of 30 symptoms. The DSI contains 30 items of particular emotional and physical symptoms

known to exist in the dialysis population. The emotional symptoms include difficulty concentrating, feeling nervous, irritable, worrying, sad, and anxious, decreased interest in sex, and difficulty becoming sexually aroused. Physical symptoms include constipation, nausea, vomiting, diarrheal, muscle cramps, swelling in legs, shortness of breath, light-headedness or dizziness, restless legs or difficulty keeping leg still, numbness or tingling in feet, feeling tired or lack of energy, cough, dry mouth, bone or joint pain, chest pain, headache, muscle soreness, dry skin, itching, trouble staying asleep, and trouble falling asleep (Weisbord et al., 2004).

Respondents were asked to answer yes or no on the presence of each symptom. For the severity of the symptoms, the DSI uses a Likert scale with one as not bothersome and five as bothers very much, for the severity of the presence symptoms. This instrument has good test-retest reliability (mean kappa 0.52 ± 0.17) and content validity in the haemodialysis population. The symptoms that were not reported will be treated as zero in severity, and the scores of the presence symptoms were summed to generate an overall severity score. Thus, the minimum possible score for the DSI is zero if no symptoms were reported and 150 when all symptoms are present and rated very much.

## 2.4 The Correlation Between Symptom Burden Among Patients Undergoing Hemodialysis

Patients who have experienced CKD cannot be cured and become a big problem, especially the problem of relatively expensive care and treatment costs. If the patient cannot be cured conservatively, then the patient needs further

treatment with haemodialysis (Widowati, 2011). Patients who have end-stage kidney disease and receive dialysis experience a high symptom burden, which causes a reduction in quality of life and is associated with an increased risk of future hospitalization and death in the future (Li et al., 2018). The symptom burden of a disease plays a central role in a patient's experience of the disease and distressing physical and psychological symptoms are one of the main manifestations of CKD. Common symptoms experienced by patients with CKD are fatigue, pruritus, irritability, anxiety and nausea (Senanayake et al., 2017).

The symptom burden among patients undergoing dialysis has been extensively investigated. Patients undergoing dialysis often experience symptoms simultaneously, with various attributes (Steven D. Weisbord, 2016). patients undergoing haemodialysis, it was reported that patients on haemodialysis suffer from high symptom burden and the prevalence, frequency, severity, and distress of symptoms of patients on haemodialysis are not consistent with one another (Cao et al., 2017). Symptom frequency, severity, and distress were higher in the dialysis group than in the no dialysis group, which was lower (Li et al., 2018).

**2.5 Synthesize Table**

| No | Author | Study Design & Sample | Data Analysis | Variable and Measurement | Result | Conclusion |
|---|---|---|---|---|---|---|
| 1. | (Kamil & Setiyono, 2018)<br><br>**Title:** Symptoms Burden and Sleep Quality Among Haemodialysis Patient | 1. a cross-sectional study<br>2. n = 202 samples | Pearson correlation analysis | 1. Variable Independent Symptom Burden used the *Dialysis Symptom Index* (DSI)<br>2. Variable Dependent Quality Sleep used *the Pittsburgh Sleep Quality Index* (PSQI) | In Symptom burden, difficulty sleeping was the most reported symptom with 178 subjects and the subjects' mean severity score was 2.93 (SD = 0.83). Based on the standard sleep quality categories using the PSQI, respondents who score five or more in the global sleep score are considered to be sleep deprived or have poor sleep quality. The mean global sleep score in this study was 8.46 (SD = 3.5), and the range of scores in this study was 0-17. In this study, no less than 90% of the subjects (n = 182) were categorized into the poor sleep quality group. This study found that patients undergoing haemodialysis had a poor level of sleep quality. Approximately 90% (n = 182) of the subjects had poor sleep quality in the past month. | Handling the symptom burden is necessary to achieve a better quality of sleep. Wang et al. (2016) also found that dialysis alone may not be sufficient to relieve symptoms. Therefore, following strict guidelines for patients undergoing haemodialysis may have an important role in reducing the burden of symptoms. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | (Senanayake et al., 2017)<br><br>**Title :** Symptom burden in chronic kidney disease; a population based cross sectional study | 1. a cross-sectional study<br>2. n = 1174 samples | Use SPSS version 20.0, non-parametric tests were used in the bivariate analysis (Mann-Whitney U test and Spearman's correlation) | 1.Independent Variable Symptom Burden used CKD *Symptom Index – Sri Lanka* (CKDSI-Sri Lanka)<br>2. Dependent Variable Chronic Kidney Disease (CKD) | Out of the 1174 participants selected to be included in the study, 56 (4.8%) did not participate in the study giving a response rate of 95.2%. The most prevalent symptoms among the study population during the 1 week under inquiry were bone/joint pain, feeling irritable, muscle cramps, lack of energy and difficulty in sleeping. Difficulty in keeping the legs still, bone/ joint pain and feeling irritable were the highest prevalent symptoms in stage V. This finding is of very important clinical significance. It is generally assumed that patients with End Stage Renal Disease (ESRD) would be subjected to dialysis and will experience a substantial improvement in physical and psychological wellbeing. However, the fact that even the CKD patients in Stage V dialysis were experiencing a high prevalence of symptoms in the present study may indicate | In conclusion, high symptom burden among CKD pa-tients is a major public health problem in the country. Unacceptable burden of symptoms among CKD patients in all stages of the disease should be brought to the no- tice of the healthcare providers caring for the CKD patients and health policymakers. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | dialysis inadequacy among the participants. | |
| 3. | (Almutary et al., 2016)<br><br>**Title:** Which Patients with Chronic Kidney Disease Have the Greatest Symptom Burden? a Comparative Study of Advanced CKD Stage and Dialysis Modality | 1. a cross-sectional study<br>2. n = 436 samples Non-dialysis group (n = 107), Dialysis group (n = 329) | Use IBM SPSS Statistics version 21, Chi-square test, ANNOVA, Shapiro-Wilk normality test, skewness, and kurtosis indices | 1. Independent Variable Symptom Burden used *the CKD Symptom Burden Index* (CKD-SBI)<br>2. Dependent Variable Chronic Kidney Disease with Dialysis and Non-Dialysis | Total symptom burden score was significantly higher in the HD group compared with other CKD groups (F (3, 415)¼31.32, p<0.001). Total symptom burden was higher in the dialysis group, compared to the non- dialysis group. Multidimensional assessment of symptoms is vital to better understand the total symptom burden, and to develop effective management through minimising the distress, severity and frequency of symptoms. Fatigue and bone or joint pain were found as the most prevalent and distressing symptoms, while sexual problems were the most severe and frequent symptoms, regardless of CKD stage. The results of this study highlight an important feature that symptoms are multidimensional. | Symptom burden is high in CKD stage 4 and 5. In CKD, symptom burden is better understood when considering the multidimen-sional aspects of a range of physical and psychological symptoms. Efforts to reduce the distress, severity and frequency of symptoms may lead to reduction of symptom burden in people with CKD. |

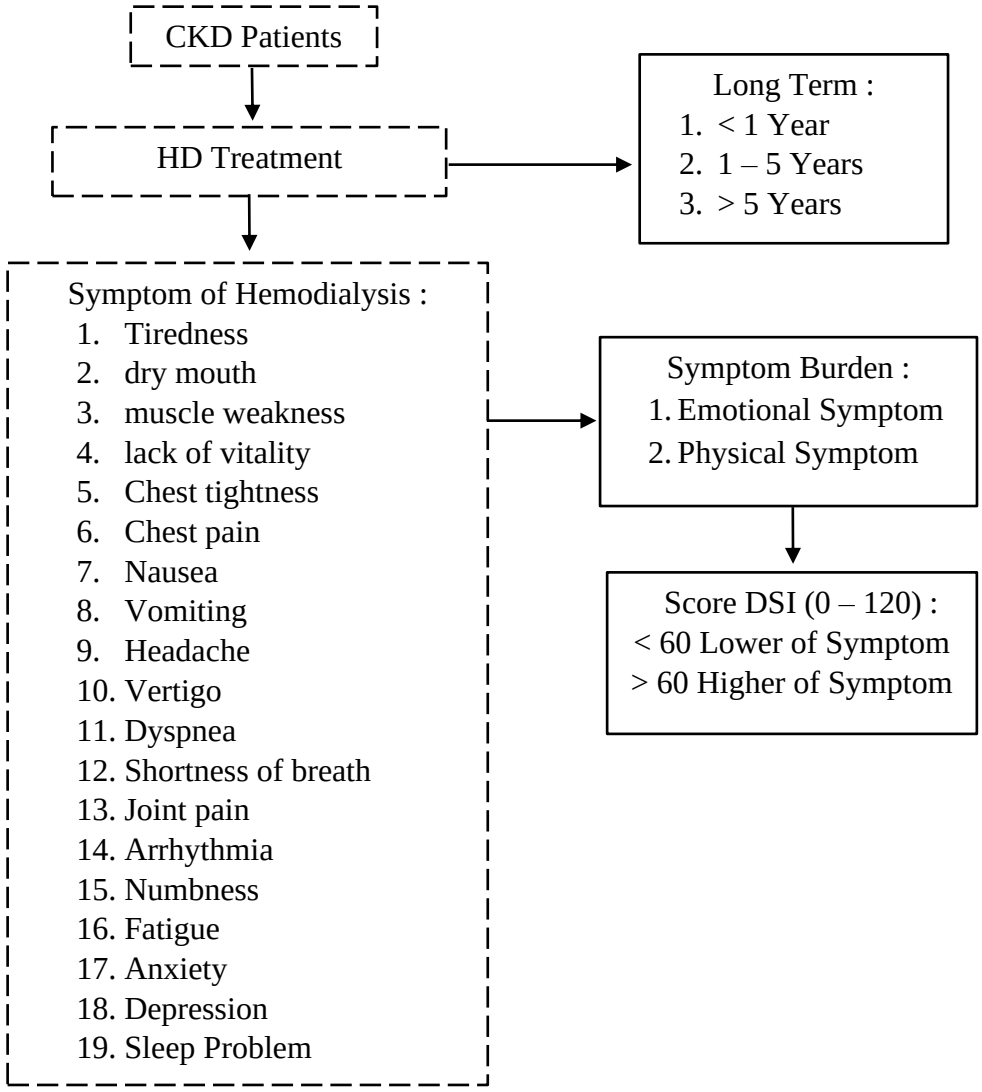
| | | | | | | |
|---|---|---|---|---|---|---|
| 4. | (Song et al., 2021)<br><br>**Title:** Correlates of Symptom Burden of Haemodialysis Patients Yuan-yuan | 1. a cross-sectional study<br>2. n = 386 samples | Use SPSS (Version 21.0, IBM Corporation, Armonk, NY), standard deviations (SDs), interquartile ranges (IQRs), Independent samples t-test and one-way analysis of variance, Pearson/Spearman, univariate Analyses, and Variance inflation factors (VIFs) | 1. Independent Variable Symptom Burden used *the Dialysis Symptom Index* (DSI)<br>2. Dependent Variable Haemodialysis Patients | The total scores of symptom burden among the participants ranged from 21 to 139, with a mean score of 74.12 (SD = 21.51). The number of symptoms experienced by the patients ranged from 4 to 24, with a mean number of 12. Three- quarters of the patients reported feeling tired or lack of energy; 73.8% reported dry skin; and 65.7% reported itch-ing. There were significant differences in symptom burden among haemodialysis patients with different gender, educa-tion, working status, per capita monthly income, and daily urine output. This study contributes to the knowledge of the overall symptom burden among haemodialysis patients and important factors affecting their symptom burden, that is., self-management, sense of coherence, and social support. | this cross-sectional study reaffirms that haemodialysis patients experience a heavy symptom burden and revealed that meaningfulness, emotional management, daily urine output, subjective support, gender, and manage- ability were the significant predictors for their symptom bur- den. The study findings suggest the necessity and importance of comprehensive and multidimensional assessments of symptom burden among haemodialysis patients. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. | (Karasneh et al., 2020)<br><br>Title : Predictors of Symptom Burden Among Haemodialysis Patients: a Cross-Sectional Study at 13 Hospitals | 1. a cross-sectional study<br>2. n = 620 samples | Statistical Soft-ware (STATA), version 14.0., Chi-square test and ANOVA test | 1. Independent Variable Symptom Burden used *the CKD Symptom Burden Index* (CKD-SBI).<br>2. Dependent Variable Haemodialysis Patients | The total symptom burden score reported by patients was 29.6 ± 16.8, and patients experienced 13 symptoms on aver- age. Muscle strain was the most common symptom, occur- ring in more than half of the population (62.6%, n = 388). This was followed by itching, anxiety, and nervousness (59.7%, 57.7%, and 57.7%, respectively). Those were also the most intense, troublesome, and recurring symptoms according to patients. Symptoms were further assessed for distress, severity, and frequency. Similarly, CCI and dialysis sessions/week were all significantly and positively associated with symptom distress, severity, and frequency, while male gender was a negative predictor for the latter characters ($P < 0.001$ for all predictors). Meanwhile, higher educational level was a determinant of symptom distress and frequency, but not severity. | Symptom burden is prevalent among HD patients in Jordan. This warrants an early symptom identification and management that may be the key to the enhancement of disease prognosis and improved survival. A multidimensional approach to symptom recognition is necessary for efficient management. Such approach should look into not only the most prevalent symptoms, but also the most severe, distressful, and recurrent. |

# CHAPTER III

## CONCEPTUAL FRAMEWORK AND HYPOTHESIS

### 3.1 Conceptual Framework




Description :

———— : The variables studied

– – – – – – : Variables that are not examined

**Chart 3.1** Conceptual Framework of The Correlation Between Symptom Burden and The Long Term To Undergo Hemodialysis Among Patients With Kidney Failure at Blambangan Hospital in 2023

## 3.2 Research Hypothesis

A hypothesis is a guess or temporary answer to a question or research purposes (Nursalam, 2020). The hypothesis of this research is: The Correlation Between Symptom Burden and The Long Term to Undergo Haemodialysis Among Patient with Kidney Failure at Blambangan Hospital in 2023

# CHAPTER IV

# RESEARCH METHODS

## 4.1 Research Design

Research design is a research design to guide researchers to get answers to research questions. In a broad sense, research design includes various things researchers do, starting from identifying problems, formulating hypotheses, operationalizing hypotheses, collecting data, and finally analysing data. In contrast, research design, in a narrower sense, refers to the type of research. Therefore, design is useful for achieving research objectives (Sugiyono, 2019).

The research design in this study uses a cross-sectional research design, a type of research in which the time of measurement/observation is only one time at a time on independent variable data and the dependent variable (Nursalam, 2020).

## 4.2 Population, Samples and Sampling Technique

### 4.2.1 Population

The research population is all subjects with certain predetermined criteria (Nursalam, 2020). The population in this study were all Chronic Kidney Disease Patients who were actively undergoing Haemodialysis therapy in the Haemodialysis Room of Blambangan Hospital in December 2022 as many 146 peoples.

### 4.2.2 Samples

The sample is an affordable part of the population that can be used as a research subject through sampling (Nursalam, 2020). Sampling with a

population exceeding 100 people can be taken 10-15% or 20-25% of the research sample from the population (Arikunto, 2013). Based on a population of 146 haemodialysis patients, this study used 10% of the population, so the total population was 59 haemodialysis patients. So, in determining the sample size to be studied by researchers using the formula.

**Sampling formula:**

$$n = \frac{N}{1 + N(d)^2}$$

Keterangan:

$n$ = Sample Size

$N$ = Population Size

$d$ = Selected Significance Level (10%)

Number of samples taken:

$$n = \frac{146}{1 + 146(0{,}1)^2}$$

$$n = \frac{146}{1 + 146(0{,}01)}$$

$$n = \frac{146}{1 + 1{,}46}$$

$$n = \frac{146}{2{,}46}$$

$n = 59{,}349$ rounded up to 59 peoples.

In determining research subjects as samples, researchers set inclusion and exclusion criteria. The criteria selected based on the inclusion and exclusion criteria are as follows:

1) Inclusion Criteria

Inclusion criteria are the general characteristics of research subjects from a target population that is reachable and will be studied (Nursalam, 2020)

The inclusion criteria in this study were as follows:

a) Willing to be a respondent
b) Patients who are recorded as undergoing haemodialysis therapy at the Blambangan Hospital

2) Exclusion Criteria

The exclusion criterion is to remove/exclude subjects who meet the inclusion criteria from the study for various reasons (Nursalam, 2020).

The exclusion criteria of this study are as follows:

a) Patients suddenly withdraw from the study due to medical reasons or advice from health workers.

### 4.2.3 Sampling Technique

Sampling is the process of selecting a portion of the population that can represent the existing population, so the sampling technique is the method used for taking appropriate samples from the overall truth of the research subject (Nursalam, 2020).

The sampling technique in this study was purposive sampling technique. Nursalam (2020) states that purposive sampling is also known as judgment sampling, which is a technique for determining a sample by selecting a sample among the population according to what the researcher wants (objectives/problems in research), so that the sample can represent previously known population characteristics.

### 4.3 Framework

The framework is a stage in a study, there is a framework presented in the research flow, especially the variables that will be used in the research (Nursalam, 2018).

The framework in this study is as follows:

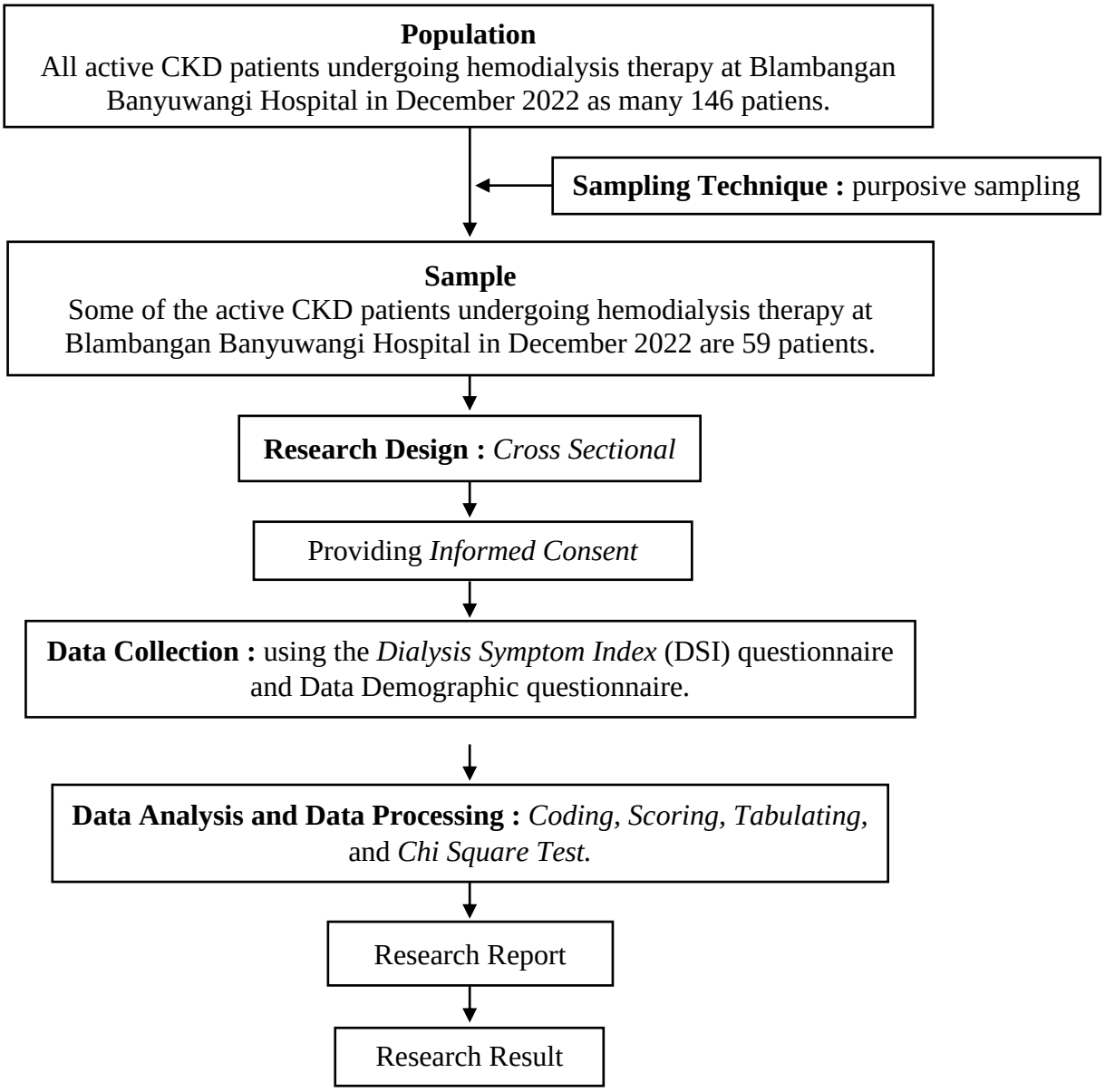



**Chart 4.1** Framework of The Correlation Between Symptom Burden and The Long Term To Undergo Hemodialysis Among Patients With Kidney Failure at Blambangan Hospital in 2023

## 4.4 Identification of Variable

### 4.4.1 Independent Variable

Independent variables are variables whose values can determine other variables (Nursalam, 2016). The independent variable in this study was "Long term to undergo Hemodialysis".

### 4.4.2 Dependent Variable

The dependent variable is a variable whose value can be determined by other variables (Nursalam, 2016). The dependent variable in this study is "Symptom Burden".

## 4.5 Operational Definition

The operational definition is a definition based on the observed characteristics of something that is defined. Characteristics that can be observed or measured are the key to the operational definition. Observable means that it allows researchers to make careful observations or measurements of an object or phenomenon which can then be repeated by others.

**Table 4.1** The Correlation Between Symptom Burden And The Long Term To Undergo Hemodialysis Among Patient With Kidney Failure at Blambangan Hospital in 2023.

| Variable | Operational definition | Indicator | Measurement | Scale | Score |
|---|---|---|---|---|---|
| Variabel Independen : Long term to undergo Hemodialysis | Hemodialysis comes from the words hemo (blood) and dialysis (separation or filtration). Hemodialysis means the process of cleaning the blood from waste substances through a filtering process outside the body. | Long term to undergo Hemodialysis | Questionnaire | Ordinal | Long Term:<br>1. < 1 Year<br>2. 1 – 5 Years<br>3. > 5 Years |
| Variabel Dependen : Symptom Burden | Symptom burden is defined as the subjective, measurable prevalence, frequency, and severity of symptoms that place a physiological burden on a patient and cause some negative physical or emotional patient response. | 1. Emotional Symptom<br>2. Physical Symptom | Questionnaire | Nominal | < 60 Lower of Symptom<br>> 60 Higher of Symptom |

## 4.6 Data Collection and Data Analysis

### 4.6.1 Research Instrument

Research instruments that can be used in nursing science can be classified into 5 parts, namely biophysiological measurements, observations, interviews, questionnaires and scales (Nursalam, 2016). The instruments used in data collection are as follows

1) The questionnaire on symptom burden uses the Indonesian version of the Dialysis Symptom Index (DSI), which is a list containing 30 physical and emotional symptoms felt by dialysis patients. Respondents were asked to answer yes or no about the presence or absence of a symptom. For the severity of these symptoms, respondents chose a Likert scale of 1 – 5, with 1 meaning not disturbing and 5 meaning very disturbing. If the respondent answered no to the question about whether or not a symptom was present, it was considered zero in terms of symptom severity. Then the minimum score is zero and the maximum is 150. the DSI confirm that the index has good test-retest reliability (mean $\kappa$ 0.52 $\pm$0.17) and content validity in the hemodialysis population (Weisbord et al., 2004).

### 4.6.2 Research Location and Time

1) Research Place

   This research was conducted in the Hemodialysis Room, Blambangan Hospital, Banyuwangi.

2) Research time

   This research was conducted on May 25 - 27 2023.

### 4.6.3 Data Collection

Researchers must carry out several tasks in the data collection process, namely choosing subjects, collecting data consistently, maintaining control in research and maintaining or validity and solving problems (Nursalam, 2016). Data collection techniques in this study include:

1) Before conducting the research, the researcher first asked for a preliminary study letter at PPPM STIKES Banyuwangi which was then given to Blambangan Banyuwangi Hospital.
2) The researcher submitted a permit to the Blambangan Banyuwangi Hospital.
3) The researcher coordinated with the Blambangan Banyuwangi Hospital regarding the application for permission to collect initial data and research permission. The Blambangan Banyuwangi Hospital gave permission to carry out initial data collection and research.
4) Researchers visited the Blambangan Banyuwangi Hospital in the haemodialysis section.
5) The researcher explained to prospective respondents about the research, research objectives, and the time needed to fill out the questionnaire for 10-15 minutes. If the patient is willing to participate in the study, the patient is asked to sign an informed consent form.
6) The researcher gave a demographic and DSI questionnaire to chronic kidney failure patients in the haemodialysis room at Blambangan Hospital and provided assistance to respondents who had difficulty filling out the questionnaire.

7) The researcher collected back the questionnaire that had been filled in by the respondent and then the researcher to check the completeness of the filling, then the researcher recapitulated and processed the research results.

## 4.7 Data Processing and data Analysis

Data analysis is a very important part in achieving the main research objectives, namely answering research questions that reveal phenomena (Nursalam, 2016). Before conducting data analysis, sequentially the data that has been successfully collected will undergo a process of editing, coding, scoring and tabulating.

### 4.7.1 Data Processing

1) *Editing*

   Editing is an attempt to re-check the correctness of the data obtained or collected. In this study, researchers checked the completeness of the answers filled in by HD patients after each form or questionnaire was completed. If there is incomplete data then the step taken is to check again complete, then the step taken is to check again (Notoatmodjo, 2018).

2) *Coding*

   Coding the data in the form of numbers (Nursalam, 2020). In this study the researcher recorded the names or initials and the results of the Dialysis Symptom Index questionnaire on the research object.

   Not at All : 1

   A Little Bit : 2

   Somewhat : 3

Quite a Bit : 4

Very much : 5

*3) Scoring*

This stage is carried out after the answer code and observation results have been determined so that each respondent's answer or observation result can be given a score (Suyanto, 2011). the researcher used the DSI questionnaire with the following conditions:

a. < 60 Lower of Symptom

b. > 60 Higher of Symptom

*4) Tabulating*

Tabulating is a presentation in tabular form consisting of several rows and columns. Tables can be used to present several variables resulting from observations, surveys or research at the same time so that the data is easy to read and understand (Nursalam, 2020).

### 4.7.2 Data Analysis

In this study the statistical test used was the *Chi Square test* and the results of the research will be presented based on the results of distributing the questionnaires and have been processed and analysed using the *IBM SPSS Statistics 25* For Windows application.

**a. Univariate Analysis**

According to Research Optimus, univariate analysis is the easiest method of analysing quantitative research data. As the name "Uni" means "one", in univariate analysis there is only one reliable variable. This analysis is used to test the research hypothesis and draw conclusions. The

goal is to obtain data, describe and summarize it, and analyze the patterns in it. The mean, standard deviation, range, percentage, and frequency will be used to measure demographic data and the length of time undergoing haemodialysis with the symptom burden variable.

**b. Bivariate Analysis**

Bivariate analysis to determine the relationship between the independent variables and the dependent variable that has been analysed. Bivariate test analysis uses the chi square test ($x^2$) with a 95% degree of confidence ($\alpha=0.05$) to test the research hypothesis of two variables that are suspected to be related or correlated. If the value ($x^2$) < 0.05, statistical calculations show that there is a relationship between the independent variables and the dependent variable.

**Table 4.2** Analysis methods for independent and dependent variables

| Purpose | Variables | Measurement Scale | Statistic Approach |
|---|---|---|---|
| Identification data variables demographics | 1. Age<br>2. Gender<br>3. Marital Status<br>4. Educational Status<br>5. Economic Status<br>6. Tribe<br>7. Religious<br>8. Long Term HD treatment | 1. Ordinal<br>2. Nominal<br>3. Ordinal<br>4. Ordinal<br>5. Ordinal<br>6. Ordinal<br>7. Ordinal<br>8. Ordinal | Descriptive Statistics |
| The Correlation Between Symptom Burden and The Long Term to Undergo HD | 1. Data Result Symptom Burden<br>2. Data Result Long Term HD Treatment from demographic questionnaire | 1. Nominal<br>2. Ordinal | Chi-Square Test |

## 4.8 Research Ethics

Before conducting the research, the researcher gave a research application permit to the Blambangan Hospital, taking into account research ethics, which included:

### 4.8.1 Informed Consent

Informed consent is a form of consent between researchers and research respondents by providing consent forms. Informed consent was given prior to the study by providing a consent form to be a respondent. The aim is that the subject understands the intent and purpose of the research. If the subject is willing, the respondent must sign the consent form, if the respondent is not willing, the researcher must respect the respondent's rights.

### 4.8.2 Anonymity (no name)

In using research subjects, it is done by not giving or including the names of respondents on the questionnaire sheet and only writing the code on the data collection sheet or research results that will be presented.

### 4.8.3 Confidentiality (Secrecy)

Researchers guarantee the confidentiality of research results, both information and other issues related to respondents. Only certain data groups will be reported on research results.

### 4.8.4 Rights to self-Determination (Right not to be a respondent)

The right to self-determination is that the respondent is asked to be a participant respondent in this study and if the respondent agrees, the respondent is asked to sign a consent letter. As for signing, the respondent is in a calm state, enough time to think and understand it (Nursalam, 2020).

### 4.8.5 Veracity

The principle of veracity is the principle of truth/honesty. The principle of veracity relates to a person's ability to tell the truth. Researchers will provide true information that respondents experience so that the relationship between researchers and respondents can be fostered properly and this research can run well (Hidayat, 2017).

### 4.8.6 Balancing Harm and Benefits

The principle implies that each study must consider the maximum benefits for the research subjects and the population where the research results will be applied (beneficence). Then minimize the risk/adverse impact for research subjects (nonmaleficence). This principle must be considered by researchers when submitting research thesis to obtain ethical approval from the research ethics committee. Researchers must consider the ratio between the benefits and losses/risks of research (Dharma, 2017).

### 4.8.7 Justice

Justice means justice, the principle of justice means that everyone has the right to equal treatment in health care efforts without considering ethnicity, religion, race, class, and socio-economic position (Purnama, 2016). Researchers in this case guarantee that there will be fairness in data collection. Because in taking the sample the researcher ignored the differences between respondents such as race, ethnicity, religion, class or position. Researchers in taking respondents based on inclusion and exclusion criteria without any distinguishing elements between respondents.

### 4.8.8 Research Limitations

Limitations in research include:

1. Researchers cannot do research with enough time due to limited time obtained by researchers related to academic learning by institutions.
2. The division of schedules for hemodialysis patients resulted in less-than-optimal research data.
3. The number of samples is only 57 samples, so the results of this study are not optimal.