CHAPTER 2
LITERATURE REVIEW

2.1 Chronic Kidney Disease (CKD)

2.1.1 Definition of Chronic Kidney Disease (CKD)

Chronic Kidney Disease (CKD) or chronic renal failure (CRF) is a condition of kidney damage that occurs for 3 months or more in the form of structural or functional abnormalities of the kidneys with or without a decrease in the Glomerulus Filtration Rate (GFR) which manifests as pathological abnormalities or kidney damage including imbalance in the composition of substances in the blood or urine and the presence or absence of disturbances in imaging examination results or a condition of kidney damage that occurs for 3 months or more in the form of a Glomerular Filtration Rate (GFR) of less than 60ml/minute/1.73m^2 with or without kidney damage (Minister of Health Regulations, 2010).

Chronic renal failure or end stage renal disease End Stage Renal Disease (ESRD) is a progressive and irreversible renal function disorder in which the body's ability fails to maintain metabolism and fluid and electrolyte balance, causing uremia (retention of urea and other nitrogenous wastes in the blood) (Cheung *et al.*, 2021). CKD is a chronic decline in kidney function that leads to irreversible and progressive kidney tissue damage. The TRF (terminal renal failure) is the last phase of CKD with very poor kidney function. Both of these can be distinguished from the creatinine clearance test (Kalantar-zadeh *et al.*, 2021).

CKD is a clinical syndrome secondary to definitive changes in kidney function and/or structure and is characterized by its irreversibility and slow and progressive evolution. Chronic kidney disease (CKD) is a non-communicable disease usually caused by diabetes and hypertension.

Cardiovascular disease is the leading cause of early morbidity and mortality in patients with CKD (Ammirati, 2021). The severity of CKD can be measured by glomerular filtration, which is estimated by the serum creatinine rate (eGFR), which indicates renal excretory function, and increased urinary albumin is measured by the urine albumin-creatinine ratio (ACR), which is a marker of kidney damage (Lizaur-Utrilla & A Lopez-Prats, 2020).

From these definitions, it can be concluded that Chronic Kidney Disease (CKD) is a non-communicable disease in the form of a secondary clinical syndrome in the form of a definitive change in function and/or kidney structure that is irreversible and progressive which lasts for 3 months or more characterized by or without a decrease in the Glomerulus Filtration Rate (GFR) of less than 60ml/min/1.73m^2 which manifests as a pathological abnormality or kidney damage including an imbalance in the composition of substances in the blood or urine and the presence or absence of disturbances in the results of imaging tests of urea and creatinine, histological examination, electrolytes and albumin.

2.1.2 Phase of Chronic Kidney Disease (CKD)

The course of chronic kidney disease is divided into 3 phase (Lizaur-Utrilla & A Lopez-Prats, 2020), namely:

2.1.2.1 Phase I

The first stage is a process of decreasing kidney reserves. About 40-75% of nephrons are not functioning. GFR is still in the 40-50% range. During this stage the serum creatinine and BUN levels are normal and the patient is usually asymptomatic.

2.1.2.2 Phase II

This stage is renal insufficiency where more than 75% of the functioning tissue has been damaged and the GFR (Glomerulus Filtration Rate) is only 25% of normal. BUN levels begin to

increase depending on the protein content in the diet. Serum creatinine levels also begin to rise accompanied by nocturia and polyuria as a result of failure to concentrate urine.

2.1.2.3 Phase III

This stage is the final stage where 90% of the nephron mass has been destroyed or only 200,000 nephrons are still intact. GFR (Glomerulus Filtration Rate) is only 10% of normal. Serum creatinine and BUN will increase. Clients will begin to feel more severe symptoms because the kidneys are no longer able to maintain homeostasis of fluids and electrolytes in the body. The urine becomes isoosmotic with plasma and the patient becomes oliguric with a urine output of less than 500 cc/day.

2.1.3 Classification of Chronic Kidney Disease (CKD)

According to Ammirati (2021) the stage of CKD is based on the glomerular filtration rate (normal GFR is 125 mL/min/1.73 m^2), namely:

2.1.3.1 Stage 1

GFR > 90 mL/min/1.73m^2, renal impairment with normal or elevated GFR.

2.1.3.2 Stage 2

GFR = 60-89 mL/min/1.73 m^2, there is a slight decrease in GFR

2.1.3.3 Stage 3

GFR = 30-59 mL/min/1.73 m^2, there is a moderate decrease in GFR

2.1.3.4 Stage 4

GFR = 15-29 mL/min/1.73 m^2, there is a heavy decrease in GFR

2.1.3.5 Stage 5

GFR < 15 mL/min/1.73 m2, end-stage renal failure occurs when the kidneys are unable to get rid of the body's metabolic wastes or perform regulatory functions and require renal replacement therapy to maintain life.

2.1.4 Etiology of Chronic Kidney Disease (CKD)

Basically, the cause of chronic kidney failure is a decrease in the glomerular filtration rate or also known as a decrease in the glomerular filtration rate (GFR). According to Kemenkes RI (2017), the causes of chronic kidney failure include:

2.1.4.1 Vascular disorders: various types of vascular lesions can cause renal ischemia and death of renal tissue. The most common lesion is atherosclerosis of the large renal arteries, with progressive scleral constriction of the vessels. Fibromascular hyperplasia in one or more large arteries that also causes occlusion of the blood vessels. Nephrosclerosis is a condition caused by long-standing untreated hypertension, characterized by thickening, loss of system elasticity, changes in renal blood pressure resulting in decreased blood flow to the kidneys and ultimately kidney failure.

2.1.4.2 Immunological disorders: such as glomerulonephritis

2.1.4.3 Infection: can be explained by several types of bacteria, especially E.Coli which comes from fecal contamination in the urinary tract bacteria. These bacteria reach the kidneys through the bloodstream or more often ascending from the lower urinary tract through the ureters to the kidneys so that it can cause irreversible kidney damage called pyelonephritis.

2.1.4.4 Metabolic disorders: such as diabetes which causes increased fat mobilization resulting in thickening of the capillary membrane and in the kidneys and continues with endothelial dysfunction resulting in amyloidosis nephropathy caused by deposition of abnormal proteinemic substances in the walls of blood vessels seriously damaging the glomerular membrane.

2.1.4.5 Primary tubular disorders: occurrence of nephrotoxicity due to analgesics or heavy metals. Urinary tract obstruction, by kidney stones, prostatic hypertrophy, and urethral constriction.

2.1.4.6 Congenital and hereditary disorders: polycystic disease is the same as a hereditary condition characterized by the presence of cysts or fluid-filled sacs in the kidneys and other organs, as well as congenital absence of kidney tissue (renal hypoplasia) and the presence of acidosis.

2.1.5 Clinical Manifestations of Chronic Kidney Disease (CKD)

There are several clinical manifestations of CKD sufferers Lukela *et al* (2019), including:

2.1.5.1 Disorders of hemopoiesis, manifested by anemia

2.1.5.2 Erythropoietin hormone deficiency

2.1.5.3 Gastrointestinal disorders: Nausea, vomiting, uremic stomatitis (dry mucosa, extensive ulcerated lesions, because the secretion of saliva contains a lot of urea and lack of oral hygiene).

2.1.5.4 Pancreatitis: Associated with impaired excretion of the enzyme amylase.

2.1.5.5 Cardiovascular: Hypertension, Pitting edema, Periorbital Edema, Enlarged neck veins, and Pericardial Friction Rub

2.1.5.6 Skin disorders:

a. Itching, especially in clients on routine dialysis due to:

1) Toxic underdialyzed uremia

2) Increased levels of potassium phosphorus

3) Dry scaly skin: Due to increased urea, it causes the accumulation of urea crystals under the skin.

4) Easy bruising skin

5) Thin and coarse hair

2.1.5.7 Abnormalities of the serous membrane

2.1.5.8 Neurology such as weakness and fatigue, confusion, disorientation, convulsions, weakness in the legs, burning sensation in the soles of the feet, and changes in behavior

2.1.5.9 Cardiomegaly and ascites

2.1.6 Pathophysiology

The pathophysiology of chronic renal failure (CKD) starts from various conditions, such as metabolic disorders (diabetes mellitus), infections (pyelonephritis), urinary tract obstruction, immunological disorders, hypertension, primary tubular disorders (nephrotoxins) and congenital disorders that cause decreased GFR (Kakitapalli *et al*., 2020). In the initial phase of the disorder, fluid balance, salt handling, and the accumulation of wastes still vary and depend on the diseased part of the kidney. Until renal function falls to less than 25% of normal, clinical manifestations of CKD may be minimal because the remaining healthy nephrons take over the function of the damaged nephron.

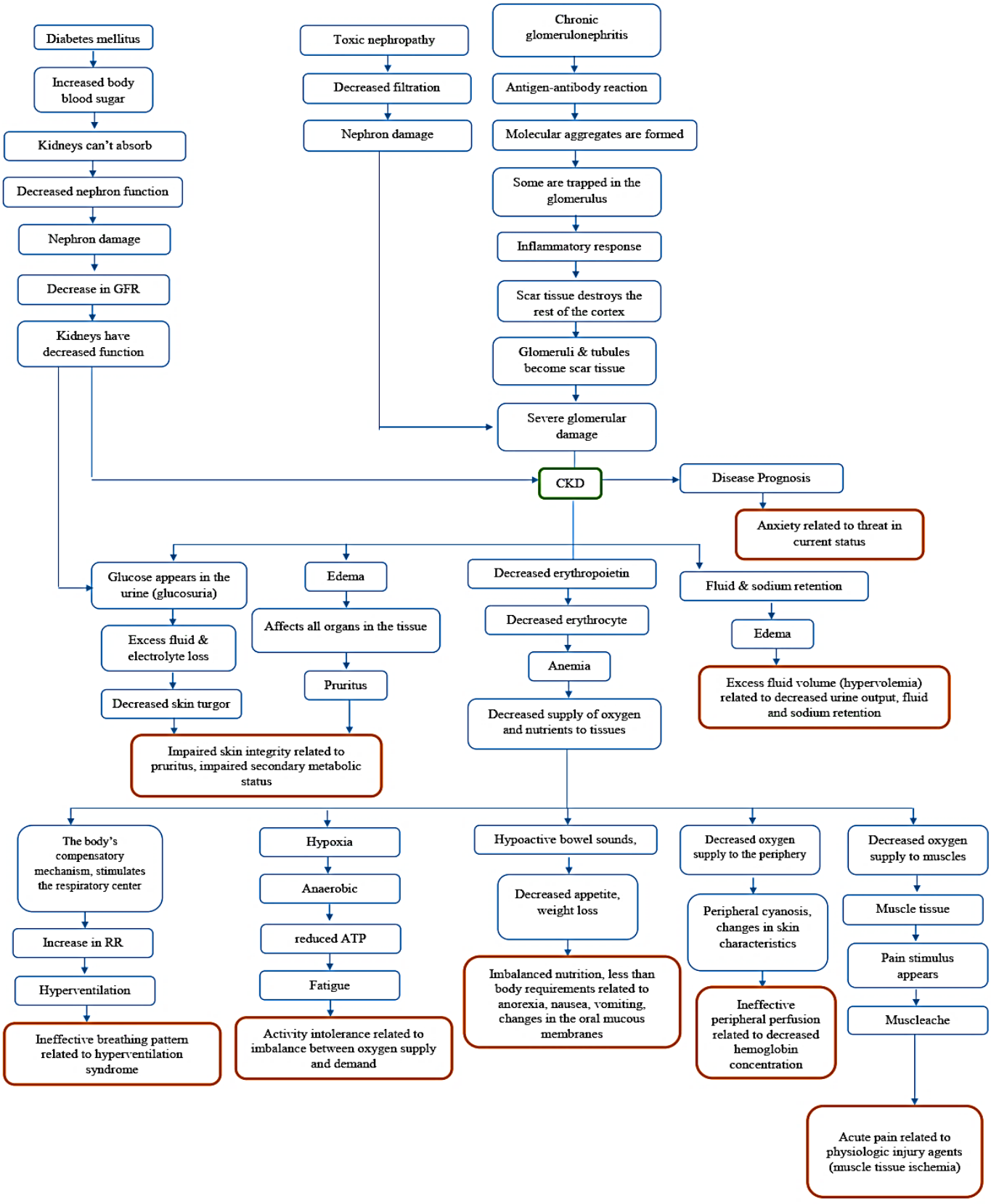
The remaining nephrons increase their rates of filtration, reabsorption, and secretion, and are hypertrophied. As more and more nephrons die, the remaining nephrons face an increasingly difficult task so that the nephrons are damaged and eventually die. Part of this cycle of death appears to be related to demands on existing nephrons to increase protein reabsorption. As the nephrons progressively shrink to increase protein reabsorption, scar tissue is formed and blood flow to the kidneys is reduced. Renin release will increase along with fluid overload so that it can cause hypertension. Hypertension will worsen the condition of kidney failure. The condition will get worse with more scar tissue forming in response to nephron damage and progressively decreasing kidney function with manifestations of accumulation of metabolites that should be removed from the circulation so that there will be a severe uremia syndrome which gives many manifestations in every organ of the body (Kalantar-zadeh *et al.*, 2021).

In the event of kidney failure, some nephrons (including the glomeruli and tubules) are thought to be intact while others are damaged (the whole nephron hypothesis). Intact nephrons hypertrophy and produce an

increased filtration volume with reabsorption even in conditions of decreased GFR/filterability. This adaptive method allows the kidneys to function until of the nephrons are damaged (Kakitapalli *et al*., 2020). The load of the material that must be dissolved becomes greater than that which can be reabsorbed, resulting in an osmotic diuresis accompanied by polyuria and thirst. Furthermore, because the number of damaged nephrons increases, it occurs accompanied by retention of waste products. The point at which the onset of symptoms in the patient becomes more pronounced and the typical symptoms of renal failure appear when approximately 80%-90% of renal function has been lost. At this level renal function is thus lower (Chen *et al.,* 2020).

Renal function decreases, the end products of protein metabolism (which are normally excreted in the urine) accumulate in the blood. Uremia occurs and affects every system of the body. The more piles of waste products, the more severe the symptoms (Nurarif & Kusuma, 2015). CKD patients will undergo hemodialysis therapy continuously in order to maintain their lives and there are factors that also influence so that the quality of life of CKD patients will be worse than other patients in general, because it will be related to the emergence of psychological problems, namely emotional overload, starting from anxiety, stress, depression, uncooperativeness, physical suffering, social problems, namely lack of interaction with others, limitations in daily activities and the high burden of costs incurred. In other words, this significantly impacts or affects the quality of life of CKD patients (Kalantar-zadeh *et al*., 2021).

2.1.7 Pathway



Source: Chen *et al.*, (2020); Kalantar-zadeh *et al.*, (2021); Nurarif & Kusuma (2015); NANDA Nursing diagnoses (2021); SDKI (2017)

2.1.8 Supporting Examination

According to Chen *et al*., (2020), the supporting examinations that can be done to support the diagnosis of chronic kidney disease include:

2.1.8.1 Radiology

Intended to assess the state of the kidneys and assess the degree of complications that occur.

2.1.8.2 Plain abdominal radiograph

To assess the shape and size of the kidneys (stones or obstruction) Dehydration will worsen the condition of the kidneys, therefore patients are not expected to fast.

2.1.8.3 IVP (Intra Venous Pyelography)

To assess the pelvicalyceal system and ureter. This examination has a risk of decreasing kidney function in certain conditions, for example: elderly, diabetes mellitus, and uric acid nephropathy.

2.1.8.4 Ultrasound

To assess the size and shape of the kidney, thickness of the renal parenchyma, density of the renal parenchyma, anatomy of the pelvicalyceal system, proximal ureter, bladder and prostate.

2.1.8.5 Renogram

To assess the function of the right and left kidneys, the location of the disturbance (vascular, parenchyma, excretion), as well as residual renal function.

2.1.8.6 Cardiac radiology examination: To look for cardiomegaly, pericardial effusion.

2.1.8.7 Bone Radiology Examination

To look for osteodystrophy (especially for the finger phalanxes), metastatic calcifications.

2.1.8.8 Pulmonary radiological examination

To look for uremic lung; the latter is considered a dam. Retrograde pyelography if reversible obstruction is suspected.

2.1.8.9 ECG to look for possible: left ventricular hypertrophy, you sign pericarditis, arrhythmias, electrolyte disturbances (hyperkalemia).

2.1.8.10 Kidney biopsy

2.1.8.11 Laboratory examinations which are generally considered supportive, the possibility of a Chronic Renal Failure:

a. Erythrocyte sedimentation rate: Elevated which is exacerbated by the presence of anemia and hypoalbuminemia.
b. Normochromic normocytic anemia, and low reticulocyte count.
c. Urea and creatinine: Elevated, usually the ratio between urea and creatinine is approximately 20:1. Note that the ratio may be elevated due to gastrointestinal bleeding, fever, extensive burns, steroid treatment, and urinary tract obstruction.
d. This ratio is reduced: Urea is less than Creatinine, on a low protein diet, and Creatinine Clearance Test is decreased.
e. Hyponatremia: generally due to excess fluid.
f. Hyperkalemia: usually occurs in advanced renal failure along with decreased diuresis.
g. Hypocalcemia and Hyperphosphatemia: occurs due to reduced synthesis of 1.24 $(OH)_2$, vit D3 in CKD.
h. Leachate phosphatase is elevated due to bone metabolism disorders, especially bone leachate phosphatase isoenzyme.
i. Hypoalbuminemia and Hypocholesterolemia: generally caused by metabolic disorders and low protein diet.
j. Elevation of Blood Sugar, due to impaired carbohydrate metabolism in kidney failure, (resistance to the influence of insulin in peripheral tissues).
k. Hypertriglyceridemia, due to disturbances in fat metabolism, is caused by an increase in insulin hormone, somatotropic hormone and a decrease in lipoprotein lipase.

l. Metabolic acidosis with respiratory compensation shows decreased pH, decreased BE, decreased HCO_3, decreased PCO_2, all caused by retention of organic acids in kidney failure.

2.1.9 Complications

Complications of chronic kidney failure according to Smeltzer (2009) in Nurarif & Kusuma (2015), include:

2.1.9.1 Hyperkalemia: due to decreased excretion, metabolic acidosis, catabolism and excess dietary intake.

2.1.9.2 Pericarditis: Pleural effusion and cardiac tamponade due to uremic waste products and inadequate dialysis.

2.1.9.3 Hypertension due to fluid and sodium retention and malfunction of the renin-angiotensin-aldosterone system.

2.1.9.4 Anemia due to decreased erythropoietin, decreased lifespan of red blood cells.

2.1.9.5 Bone disease and calcification due to phosphate retention, low serum calcium levels, vitamin D metabolism and elevated aluminum levels.

2.1.9.6 Metabolic acidosis, Renal Osteodystrophy & Sepsis, Peripheral neuropathy, Hyperuremia.

2.1.10 Management

The goals of management are to maintain fluid-electrolyte balance and prevent complications, which are as follows Nurarif & Kusuma (2015), namely:

2.1.10.1 Dialysis

Dialysis can be performed by preventing serious complications of kidney failure, such as hyperkalemia, pericarditis, and seizures. Dialysis corrects biochemical abnormalities, allows fluid, protein and sodium to be consumed freely, eliminates

bleeding tendencies and aids wound healing. This therapy is carried out if the kidney function has greatly decreased (more than 90%) so that it is no longer able to maintain individual survival, it is necessary to do therapy. So far, there are 2 types of dialysis known:

a. Hemodialysis (dialysis with a dialyser machine)

   Hemodialysis or HD is a type of dialysis using a dialyzer machine that functions as an artificial kidney. In this process, blood is pumped out of the body, into the dialyzer machine. In the dialyzer machine, the blood is cleaned of toxic substances through the process of diffusion and ultrafiltration by dialysate (a special fluid for dialysis), then after the blood is cleaned, the blood is flowed back into the body. This process is done 1-3 times a week in a hospital and each time takes about 2-4 hours.

b. Peritoneal dialysis (dialysis through the stomach)

   The second therapy is peritoneal dialysis for the dialysis method with the help of the peritoneal membrane (the lining of the abdominal cavity). So, the blood does not need to be removed from the body to be cleaned and filtered by the dialysis machine.

2.1.10.2Correction of hyperkalemia

Controlling blood potassium is very important because hyperkalemia can cause sudden death. The first thing to remember is not to cause hyperkalemia. In addition to blood tests, hyperkalemia can also be diagnosed by EEG and ECG. If hyperkalemia occurs, then the treatment is to reduce potassium intake, give Na Bicarbonate, and give glucose infusion.

2.1.10.3Correction of anemia

The first effort should be aimed at addressing the deficiency factor, then looking for bleeding that might be manageable.

Overall control of kidney failure will be able to increase Hb. Blood transfusions can only be given when there are strong indications, such as coronary insufficiency.

2.1.10.4 Correction of acidosis

Administration of acid through food and drugs should be avoided. Sodium Bicarbonate can be given orally or parenterally. Initially, 100 mEq of sodium bicarbonate was given slowly intravenously, repeated if necessary. Hemodialysis and peritoneal dialysis can also treat acidosis.

2.1.10.5 Hypertension control

Administration of beta blockers, alpha methyldopa and vasodilators was performed. Reducing salt intake in controlling hypertension must be careful because not all kidney failure is accompanied by sodium retention.

2.1.10.6 Kidney transplant

By transplanting a healthy kidney into a patient with chronic kidney failure, all kidney function is replaced by a new kidney.

2.1.11 Prevention

Chronic kidney failure is one type of non-communicable disease that has a fairly high morbidity rate, however, this disease can be avoided through prevention efforts which include (Kakitapalli *et al*., 2020):

2.1.11.1 Better control of diabetes, high blood pressure, and heart disease.

Kidney disease is a secondary disease resulting from the underlying primary disease. Therefore, it is necessary to control and control the primary disease so that complications do not become kidney failure.

2.1.11.2 Reducing foods that contain salt

Foods with a high sodium content. High sodium not only usually causes high blood pressure, but will also trigger the process of forming kidney stones.

2.1.11.3Drink plenty of water every day

Water is a food component that the body needs to avoid dehydration. In addition, water can also be useful in helping remove toxins from the body. And will also help to maintain the fiber volume of the blood concentration. It can also be useful in maintaining the digestive system and helps control body temperature. So, don't let your body get dehydrated.

2.1.11.4Do not hold back urination

Blood filtration is a function the most important of which is the kidney. During the filtering process takes place, then the amount of excess fluid will be stored in the in the bladder and after that must be discarded immediately. Although bladder is able to hold more urine, but cravings urination will be felt when the bladder is full about 120-250 ml of urine. You should never hold your miction. This will have a major impact on the occurrence of the kidney filtering process.

2.1.11.5Eat good food

Eating well is eating with better nutritional and nutritional content. Avoid eating junk food.

2.2 Concept of Nursing Care in Chronic Kidney Disease (CKD)

2.2.1 Assessment

Assessments that can be done on clients with CKD include several things, namely:

2.2.1.1 Biodata

Ask the client's identity including full name, date of birth, address and so on and then match it with the name label to

ensure that every medical record, note, test result and so on is indeed the client's. Gleadle (2007) in Kakitapalli *et al*., (2020). In other hand, an unhealthy lifestyle also have a relationship with CKD disease because men are very at risk (Nurarif & Kusuma, 2015).

2.2.1.2 Chief complaint

CKD clients with skin problems usually have complaints such as dry to scaly skin, rough, pale, itchy, irritated from scratching, edema (Nurarif & Kusuma, 2015).

2.2.1.3 Current medical history

Clients will complain of decreased urine output (oliguria) to anuria, anorexia, nausea and vomiting, fatigue, breath smells of urea, changes in the skin. This condition occurs due to the buildup (accumulation) of metabolic waste substances/toxins in the body because the kidneys fail in filtration (Nurarif & Kusuma, 2015).

2.2.1.4 Past medical history

A history of drug use, a history of acute kidney failure, UTI, or predisposing factors such as diabetes mellitus and hypertension are usually common in patients with CKD (Nurarif & Kusuma, 2015).

2.2.1.5 Physical Examination (Head to Toe)

The first checks that should be done before performing a physical examination include (Nurarif & Kusuma, 2015):

a. Blood pressure: in CKD clients, blood pressure tends to increase from mild to severe hypertension. While the range of normal blood pressure measurements in adults is 100-140/60-90 mmHg with an average of 120/80 mmHg and in the elderly 100-160/60-90 mmHg with an average of 130/180 mmHg.

b. Pulse: the CKD client is usually strong and if accompanied by cardiac dysrhythmias, the pulse will be soft and weak. The normal pulse rate for adults is 60-100 beats per minute.
c. Temperature: in CKD clients usually the temperature will increase due to sepsis or dehydration resulting in fever. Temperature in adults normally differs at each location. At axillary 36.4°C, rectal 37.6°C, oral 37.0°C.
d. Respiratory rate in CKD clients will tend to increase due to tachypnea and dyspnea. The normal range of respiratory rate in adults is 12-20 x/minute with an average of 18 x/minute.
e. The general condition of CKD clients tends to be weak and looks seriously ill, while the level of consciousness decreases because the central nervous system is affected according to the level of uremia that affects it (Nurarif & Kusuma, 2015). After the TTV examination is complete, the physical examination includes:
    1) Head

       Inspection: In CKD clients, the hair looks thin and dry, changes color and easily falls out, the face will look pale, the skin looks dry and dull.

       Palpation: Hair will feel rough, skin feels rough.
    2) Ears

       Inspection: Check the symmetry and position of both ears, cerumen production, color, cleanliness and audibility. In CKD clients, see the presence of uremic frost.

       Palpation: Check the presence or absence of mass, elasticity or tenderness in the tragus, in CKD clients the skin will feel rough because it is dry.

3) Eyes

Inspection: In CKD clients, calcifications (calcium phosphate mineral deposits) will be seen due to protracted uremia at the edge of the eye, around the eyes will appear edema, blurred vision and the conjunctiva will look pale if someone has severe anemia.

Palpation: The eyeball will feel supple and bouncy, around the eye will feel edema.

4) Nose

Inspection: Check for the production of secretions, the presence or absence of nostril breathing, the symmetry of the two nostrils, the skin will look dry and dull.

Palpation: Check whether there is a mass and tenderness in the sinuses or not, there is a nasal bone dislocation or not, it will feel rough.

5) Mouth

Inspection: At the time of breathing will smell the smell of ammonia due to uremic factors, ulceration of the gums, lips look dry. Check for mass or not, neck swelling or stiffness, dry, pale, dull skin.

Palpation: Check for enlarged lymph nodes, mass or not. Check the position of the trachea there is a shift or not, the skin feels rough.

6) Chest

a) Lung

Inspection: In CKD clients, chest movements will be fast because the breathing pattern is also fast and deep (Kussmaul), cough with thick and abundant sputum if there is pulmonary edema, the cough will be productive, producing pink and watery sputum,

dry skin, uremic frost, pale or discolored skin and scaly.

Palpation: Check the chest wall movement is palpable or not, there is pain and edema or not, the skin feels rough and the surface is uneven.

Percussion: Percussion of all lung fields is normally resonant and in CKD is dull when the lungs are filled with fluid due to edema.

Auscultation: Listen for additional breath sounds such as rhonchi, wheezing, pleural friction rub and stridor.

b) Heart

Inspection: Normally there will be a pulsation at ICS 5 left midclavicular mitral valve in some people with a normal diameter of 1-2 cm.

Palpation: Normally, a pulsation will be palpable at ICS 5, left midcalcicula of the mitral valve.

Percussion: Normally in the heart area, there will be a dull sound at ICS 3-5 to the left of the sternum.

Auscultation: In CKD clients, cardiac dysrhythmias will occur and a heart murmur will be heard (usually in the elderly) in CKD clients who have hypertension.

7) Abdomen

Inspection: Abdominal skin will look shiny due to ascites and dry, pale, scaly skin, yellowish brown in color, pruritus will appear.

Auscultation: Listen for bowel sounds in all four quadrants of the abdomen.

Percussion: Clients with CKD will complain of pain when examined at the costo-vertebral angle in patients with kidney disease.

Palpation: Palpate the area that was last examined for pain, palpable mass or not in the kidney.

8) Skin and nails

Inspection: Nails will become brittle and thin, skin becomes pale, dry and peeling, scaly, pruritus will appear, yellowish brown color, hyperpigmentation, bruising, uremic frost, ecchymosis, petechiae.

Palpation: CRT > 3 seconds, the skin feels rough and uneven Muttaqin & Sari (2011) in Nurarif & Kusuma (2015). The dry skin level uses a 5-point dryness scale through visuals (Amano *et al.,* 2017 in Nurarif & Kusuma, 2015).

9) Genetalia

Inspection: Look at the genital hygiene, whether the lesions appear or not (Nurarif & Kusuma, 2015).

10) Extremities

Inspection: In CKD clients there is edema in the legs due to gravity usually found in the calves and thighs in clients who are bed rest, weakness, fatigue, dry skin, hyperpigmentation, scaly (Nurarif & Kusuma, 2015).

Palpation: Skin turgor > 3 seconds due to edema, skin feels dry and rough (Nurarif & Kusuma, 2015).

2.2.1.6 Psychosocial Assessment and Daily Activities

a. Activities and Rest

Symptoms: extreme fatigue weakness and malaise, sleep disturbances (insomnia/restlessness or somnolence). Signs: muscle weakness, loss of tone, decreased range of motion (Nurarif & Kusuma, 2015).

b. Ego Integrity and Psychosocial Response

Symptoms: Stress factors, financial examples, relationships, and so on. A helpless role, no hope, no power. Signs: Rejection, anxiety, fear, anger, irritability, personality changes (Nurarif & Kusuma, 2015).

c. Elimination

Symptoms: Rapid weight gain (edema), weight loss (malnutrition). Anorexia, Malnutrition, bloating, diarrhea, constipation. Signs: Changes in urine color, for example, dark yellow, red, brown, colored. Oliguria, may become anuria (Nurarif & Kusuma, 2015).

d. Feeding/Liquid

Symptoms: Rapid weight gain (edema), weight loss (malnutrition). Anorexia, heartburn, nausea/vomiting, unpleasant metallic taste in the mouth (ammonia breath), diuretic use. Signs: Abdominal distension/ascites, enlarged liver (late stage). Changes in skin turgor. Edema (common, dependent). Gum ulceration, bleeding gums/tongue. Decreased muscle, decreased subcutaneous fat, looks powerless (Nurarif & Kusuma, 2015).

e. Neurosensation

Symptoms: Headache, blurred vision, muscle cramps/spasms, Leg syndrome, restlessness, numbness, burning sensation in the soles of the feet. Tingling numbness and weakness, especially in the lower extremities (peripheral neuropathy). Signs: Mental system disorders, for example, decreased attention span, inability to concentrate, memory loss, confusion, decreased level of consciousness, coma. Seizures, muscle fasciculations, spastic activity, thin hair, brittle nails and tips (Nurarif & Kusuma, 2015).

f. Pain/Comfort

Symptoms: Pelvic pain, headache, muscle cramps/leg pain. Worsens at night. Signs: cautious and restless behavior (Nurarif & Kusuma, 2015).

2.2.2 Nursing Diagnoses

Nursing diagnoses that may appear in patients with kidney failure according to Nurarif & Kusuma (2015), namely:

2.2.2.1 Excess fluid volume (hypervolemia) related to decreased urine output, fluid and sodium retention.

2.2.2.2 Imbalanced nutrition less than body requirements related to anorexia, nausea, vomiting, changes in oral mucous membranes.

2.2.2.3 Ineffective breathing pattern related to hyperventilation syndrome

2.2.2.4 Impaired skin integrity related to pruritus, impaired secondary metabolic status.

2.2.2.5 Anxiety related to threat in current status

2.2.2.6 Impaired sense of comfort related to symptoms of chronic disease (diabetes mellitus/chronic kidney failure)

2.2.3 Nursing Intervention

Table 2. 1 Nursing Intervention of CKD

No.	Nursing Diagnoses	Goals and Outcome Criteria (NOC)	Intervention (NIC)
1.	Excess fluid volume (hypervolemia) related to decreased urine output, fluid and sodium retention (SDKI Page 62, D.0022)	After nursing actions for 3x8 hours, the hypervolemia decreased with the following criteria: 1. Balanced fluid intake 2. Increased urine output 3. Decreased edema 4.Blood pressure improves 5. Improved skin turgor	**Hypervolemia Management** **Observation:** - Check for signs and symptoms of hypervolemia (edema, dyspnea, extra breath sounds). - Monitor fluid intake and output. - Monitor the amount and color of urine

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			Therapeutic - Limit fluid and salt intake - Elevate the head of the bed **Education** - Explain the purpose and procedure of fluid monitoring **Collaboration** - Collaborative administration of diuretics. - Collaborative replacement of potassium loss due to diuretics. - Collaboration in providing continuous renal replacement therapy (CRRT), if necessary.
2.	Imbalanced nutrition less than body requirements related to anorexia, nausea, vomiting, changes in oral mucous membranes (SDKI page 56, D.0019)	After nursing actions for 3x8 hours, it is expected that the patient's nutritional needs will be fulfilled with the following criteria: 1. Adequate nutritional intake 2. Adequate food and fluid intake	**Nutrition Management** **Observation** - Identification of nutritional status. - Identify preferred foods. - Monitor food intake. - Monitor weight **Therapeutic** - Perform oral hygiene before eating, if necessary. - Serve food attractively and at the appropriate temperature. - Provide high-fiber foods to prevent constipation **Education** - Advise sitting position, if able. Teach programmed diet. **Collaboration** - Collaboration with nutritionists to determine the number of calories and types of nutrients needed, if necessary. - Collaboration of giving medication before eating.
3.	Ineffective breathing pattern related to hyperventilation syndrome (NANDA Nursing diagnoses. 2021-2023: 295, domain	After nursing care for 1 x 15 minutes is expected to have an effective breathing pattern, with the following criteria: 1. Client feels comfortable without	**Respiratory Monitoring** **Observation** Assess and record respiratory status (bradypnea, tachypnea, hyperventilation and other types of additional breath sounds).

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	4, class 4, code: 00032)	respiratory depression. 2. Demonstrate a patent airway (breathing rate within normal range, no abnormal breath sounds) 3. The client reports his ability to breathe comfortably.	**Independent/Therapeutic** Help the client to be in a comfortable position that allows maximum chest expansion (semi-fowler position or proning position). **Education** Teach pursed lip breathing techniques. **Collaboration** Collaboration with doctors for oxygen administration.
4.	Impaired skin integrity related to pruritus, impaired secondary metabolic status (SDKI Page 282, D.0129)	After nursing actions for 3x8 hours, it is expected that skin integrity can be maintained with the following criteria: 1. Good skin integrity can be maintained 2. Good tissue perfusion 3. Able to protect skin and maintain skin moisture	**Management of Pruritu** **Observation** Inspect/observe the client's skin condition and report any changes (eg, there are lesions, xerosis, hyperpigmentation, etc.). **Independent/Therapeutic** Maintain skin moisture (eg using olive oil/baby oil). **Education** - Teach the client or family related to the causal factors of the skin condition and its relation to the disease that is currently being experienced by the client. - Advise to use light clothing and absorb sweat. - Teach not to scratch with sharp nails or sharp surrounding objects **Collaboration** Collaboration with doctors for the administration of topical antihistamines (if necessary).
5.	Anxiety related to threat at current state (NANDA Nursing Diagnoses 2021-2023: 405, domain 9, class 2, code: 00146).	After nursing care is carried out for 1 x 30-45 minutes, it is expected that the client will report the reduction in anxiety is maintained from a scale of 2 to a scale of 5, with the following criteria: 1. Anxiety scores may decrease.	**Anxiety Reduction** **Observation** Monitor for signs of anxiety (verbal and nonverbal). **Independent/Therapeutic** - Listen attentively and create a comfortable therapeutic atmosphere - Assist clients in doing relaxation techniques.

(Continued on next page)

		2. The client looks calm and not restless. 3. The client is able to practice relaxation techniques independently to reduce anxiety.	**Education** Teach the client about relaxation techniques that can be done when anxiety behavior occurs. **Collaboration** Collaboration with doctors regarding the administration of antianxiety drugs if necessary.
6.	Activity intolerance related to imbalance between oxygen supply and demand (SDKI page 128, D.0056)	After nursing actions for 3x8 hours, activity tolerance increases with the following criteria: 1. Complaints of tiredness decreased 2. Oxygen saturation in the normal range (95%-100%). 3. Pulse rate in the normal range (60-100 beats/minute). 4. Dyspnea during activity and after activity decreases (16-20 times/minute)	**Energy Management** **Observation** - Monitor physical fatigue - Monitor sleep patterns and hours **Therapeutic** - Do passive/active range of motion exercises - Involve the family in activities, if necessary. **Education** - Advise to do the activity gradually. - Encourage the family to provide positive reinforcement. **Collaboration** Collaboration with nutritionists on how to increase food supply.
7.	Ineffective peripheral perfusion related to reduced hemoglobin concentration (SDKI page 37, D.0009)	After treatment for 3x8 hours, the peripheral perfusion increased with the criteria results: 1. Peripheral pulse Increase 2. Decreased pale skin color 3. Decreased muscle weakness. 4. Capillary refill improves 5. Akral is getting better 6. Improved skin turgor	**Circulation care** **Observation** - Check peripheral circulation (eg peripheral pulse, edema, capillary refill, color, temperature). - Monitor skin changes. - Monitor heat, redness, pain or swelling. - Identification of risk factors for circulatory disorders **Therapeutic** - Avoid infusion or blood collection in areas of limited perfusion. - Avoid measuring blood pressure in extremities with limited perfusion - Take infection prevention. - Perform foot and nail care.

(Continued on next page)

			Education - Recommend smoking cessation. - Encourage regular exercise. - Recommend checking the bath water to avoid sunburn. - Recommend taking blood pressure control medication regularly. **Collaboration** Giving Collaboration corticosteroids, if necessary.
8.	Acute pain related to physiological injuring agents (muscle tissue ischemia) (SDKI page 172, D. 0077)	After nursing actions for 3x8 hours, the pain link increases with the following criteria: 1. Reported pain control increased 2. The ability to recognize the onset of pain increases 3. Increased ability to use non-pharmacological techniques. 4. Complaints of pain use decreased analgesics 5. Grimace decreases 6. Pulse rate improves 7. Improved breathing pattern 8. Blood pressure improves	**Pain Management** **Observation** - Identification of trigger factors and pain relief - Monitor pain quality - Monitor the location and spread of pain - Monitor pain intensity using a scale - Monitor the duration and frequency of pain **Therapeutic** - Teach non-pharmacological techniques to reduce pain - Facilitate rest and sleep **Education** - Advise self-monitoring of pain - Advise use of analgesics appropriately **Collaboration** Collaborative administration of analgesic drugs

Source: Nurarif & Kusuma (2015); NANDA Nursing diagnoses (2021); SDKI (2017); SIKI (2017)

2.2.4 Nursing Implementation

Nursing implementation is the realization of an action plan to achieve the goals that have been set. Activities in implementation also include continuous data collection, observing client responses during and after the action, and assessing new data (Minannisa, 2019). Implementation is used to assist clients in achieving the goals that have been set through the implementation of nursing care plans in the form of interventions. At this stage the nurse must have the ability to in effective communication, able to create a relationship of mutual trust and mutual assistance, systematic observation, able to provide health education, ability in advocacy and evaluation. Implementation is an action that has been planned in the treatment plan. This action includes independent and collaborative action (Budiono, 2016). The management of the embodiment of interventions including validated activities, nursing plans, documenting plans to provide medical advice in data collection and carrying out collaboration with doctors and hospital regulations (Erita *et al*., 2019).

2.2.5 Evaluation of Nursing Care

Nursing evaluation is an assessment by comparing changes in the patient's condition (observed results) with the goals and outcome criteria that the nurse made at the planning stage. The objectives of the evaluation include: ending the nursing action plan, modifying the nursing action plan and continuing the nursing action plan. Evaluation is carried out on an ongoing basis by involving clients and other health workers. In general, evaluation is aimed at seeing and assessing the client's ability to achieve goals and examine the causes if the goals of nursing care have not been achieved (Minannisa, 2019).

2.3 Basic Concepts of Anxiety

2.3.1 Definition of Anxiety

Anxiety comes from the Latin angustus which means stiff, and ango, anci which means to strangle. Anxiety is also defined as a distinctive feeling of displeasure caused by the alleged danger or frustration that threatens to endanger the sense of security, balance or life of the individual or his biosocial group. Anxiety is a pathological condition characterized by feelings of fear accompanied by somatic signs that indicate a hyperactive autonomic nervous system (Adwas *et al*., 2019).

Anxiety is an emotional reaction that arises from unspecified causes that can cause feelings of discomfort and feeling threatened. This emotional state is usually a subjective individual experience for which no specific cause is known. Anxiety is an individual's subjective emotional state and experience. Both are energies and cannot be observed directly. A nurse assesses an anxious patient based on certain behaviors. It is important to remember that anxiety is a part of everyday life. Anxiety is fundamental to the human condition and provides valuable warnings. In fact, the capacity to become anxious is necessary for survival. In addition, one can grow from anxiety if one is successful in dealing with, relating to, and learning from creating anxiety experiences (Adwas *et al*., 2019).

Anxiety experiences is a vague feeling of discomfort or worry accompanied by an autonomic response (the source is often non-specific or unknown to the individual); feeling of fear caused by anticipation of danger. This is an alert signal that warns the individual of a danger and enables the individual to act in the face of the threat (NANDA International Nursing Diagnoses, 2018). In other hand, anxiety is an individual’s emotional condition and subjective experience of objects that are unclear and specific due to the

anticipation of danger that allows individuals to take action to deal with threats (Tim POKJA PPNI, 2017).

2.3.2 Etiology of Anxiety

There are three psychological theories that mention the causes of anxiety (Adwas *et al.*, 2019), namely:

2.3.2.1 Psychoanalytic theory

Freud stated that anxiety is a sign of danger that a person sometimes does not realize. Anxiety is seen as the result of a psychic conflict between aggressive desires or unconscious drives and concurrent threats from the superego or external reality. In response to this signal, the ego creates a defense mechanism to prevent unacceptable thoughts or feelings from escaping into the conscious mind.

2.3.2.2 Behavioral theory

This theory suggests that anxiety is a conditioned response in accordance with the presence of a specific stimulus from the environment. Individuals receive certain stimuli as unwelcome stimuli, causing anxiety. After repeated occurrences eventually become a habit to avoid the stimulus.

2.3.2.3 Existential theory

This theory provides models of generalized anxiety, in which there is no identifiable stimulus for chronic feelings of anxiety. The core concept of this theory is that people experience the feeling of living in an aimless world. Anxiety is a response to the perception of the emptiness.

Anxiety can also be caused by a person's biological condition, several things that may be the cause by Adwas *et al* (2019)including:

a. Autonomic nervous system

   Stimulation of the autonomic nervous system causes certain symptoms such as: cardiovascular (tachycardia), muscular

(headache), gastrointestinal (diarrhea), and respiratory (tachypnea). The autonomic nervous system in patients with anxiety disorders, especially panic disorder, shows increased sympathetic tone, adapts slowly to repeated stimulation, and adapts excessively to moderate-intensity stimuli.

b. Neurotransmitters

There are several neurotransmitters associated with anxiety, namely:

1) Norepinephrine

Chronic symptoms experienced by patients with anxiety, such as panic attacks, insomnia, fear, and increased autonomic activity, are characterized by increased noradrenergic function. The general theory about the role of epinephrine in anxiety disorders is that patients may have an unregulated noradrenergic system.

2) Serotonin

Serotonin is a neurotransmitter that is responsible for regulating our moods. When serotonin levels are low, a person tends to experience anxiety, depression and irritability.

3) Gamma-aminobutyric acid (GABA)

Some patients with anxiety disorders are thought to have poor GABA receptor function. Then the role of GABA in anxiety is proven by the benefits of benzodiazepines that work to increase GABA activity at GABA receptors which can overcome generalized anxiety disorders and panic disorders. The investigators hypothesized that some patients with anxiety disorders had abnormal GABA receptor function, although a direct relationship between the two has not been elucidated.

In addition to the causes already mentioned, according to Maina (2016) anxiety can be caused by:

a) External Factors
    1. Threats to self-integrity

       Includes physiological disability or disturbance of basic needs (illness, physical trauma, surgery to be performed).
    2. Threat of self system

       These include: threats to self-identity, self-esteem, interpersonal relationships, loss, and changes in status and roles.

b) Internal Factor
    1. Potential stressors

       Psychosocial stressors are conditions that cause changes in life so that individuals are required to adapt.
    2. Maturity

       The maturity of the individual's personality will affect the anxiety he faces. Individuals who are more mature are more difficult to experience disorders due to anxiety, because individuals have greater adaptability to anxiety.
    3. Education

       The higher the level of education, the easier it is for individuals to think rationally and capture new information. Analytical skills will make it easier for individuals to describe new problems.
    4. Socio-economic status

       A person's low socioeconomic status will cause individuals to easily experience anxiety.

5. Physical condition and health status

   Individuals who experience physical disorders or problems with their health conditions, for example suffering from certain diseases that are difficult to cure or suffering from certain diseases that have never been experienced before or rarely experienced by other people or even people who suffer from certain diseases in the final stages will easily experience anxiety about their lives. In addition, physical fatigue due to declining health conditions experienced by a person will make it easier for individuals to experience anxiety.

6. Environment and situation

   Someone who is in a foreign environment is more prone to anxiety than in a familiar environment.

7. Social support

   Social support from the presence of other people helps a person reduce anxiety while the environment affects the individual's thinking area.

In addition, according to Nurhalimah (2016) it states that anxiety can be expressed directly through the emergence of symptoms or coping mechanisms developed to explain the origin of anxiety, namely:

a. Predisposing Factors:

   1) Psychoanalytic factors, anxiety is an emotional conflict that occurs between two personality elements, the id and the superego. The id represents one's instinctual and primitive impulses, while the superego reflects one's conscience and is controlled by one's cultural norms. The ego, or I, functions to mediate the demands of two opposing elements, and the function of anxiety is to alert the ego that there is danger.

2) Interpersonal factors, that anxiety arises from feelings of fear of the absence of interpersonal acceptance and rejection. Anxiety is also associated with the development of trauma, such as separation and loss, which results in specific weakness. People with low self-esteem are especially prone to developing severe anxiety.
3) Behavioral factors, anxiety is a product of frustration, namely everything that interferes with a person's ability to achieve the desired goal.
4) Family studies show that anxiety disorders usually run in families. Anxiety disorders also overlap between anxiety disorders and depression.
5) Biological studies have shown that the brain contains specific receptors for benzodiazepines, drugs that increase the inhibitory neuroregulatory action of gamma-aminobutyric acid (GABA), which play an important role in the biologic mechanisms associated with anxiety. In addition, the individual's general health and family history of anxiety have a significant effect on predisposing to anxiety. Anxiety may be accompanied by physical disturbances and further decrease the individual's ability to cope with stressors.

b. Precipitation Factor

Trigger stressors can come from internal or external sources. Precipitating stressors can be grouped into two categories:

1) Threats to physical integrity include impending physiological disability or decreased ability to perform activities of daily living.
2) Threats to the self-system can jeopardize the identity, self-esteem, and integrated social functions of the individual.

Meanwhile, according to NANDA International Nursing Diagnoses (2018), states there are several causes of anxiety, including: conflict

about the purpose of life, interpersonal relations, interpersonal contagion, stressors, substance abuse, death threats, threats on current status, needs are not met, value conflict.

2.3.3 Anxiety Classification

According to the Nurhalimah (2016), there are 4 classifications of anxiety levels, namely:

2.3.3.1 Mild Anxiety

The cause of mild anxiety is usually due to daily life experiences and allows the individual to become more focused on reality. Individuals will experience discomfort, irritability, restlessness, or the presence of habits to reduce tension (such as biting nails, pressing the toes or hands). Physiological responses that occur in mild anxiety are slightly increased pulse and blood pressure, gastric disturbances, wrinkled face, and trembling lips. Cognitive and affective responses that occur are impaired concentration, unable to sit still, and the voice sometimes rises.

2.3.3.2 Moderate Anxiety

In moderate anxiety, the individual's field of view narrows. In addition, individual experience decreased hearing, vision, lack of capturing information and show a lack of attention to the environment. The ability to think clearly is inhibited, but there is still the ability to learn and solve problems, even though it is not optimal. The physiological responses experienced are palpitations, increased pulse and respiratory rate, cold sweats, and mild somatic symptoms (such as gastric disturbances, headaches, frequent urination). There was a slight shaking sound. Mild or moderate anxiety can be something that is constructive because the anxiety that occurs is a signal that the individual needs attention or that the individual's life is in danger.

2.3.3.3 Severe Anxiety

The higher the level of anxiety, the person's field of view will decrease or narrow. A person experiencing severe anxiety is only able to focus on one thing and has difficulty understanding what is happening. At this level the individual is not possible to learn and solve problems, it could even be that the individual is dazed and confused. Somatic symptoms are increased, shaking, hyperventilating, and experiencing intense fear.

2.3.3.4 Panic

Individual who experience panic have difficulty understanding events in the surrounding environment and lose sight of reality. Habits that arise are pacing, tantrums, shouting, or withdrawal from the surrounding environment. The presence of hallucinations and false sensory perceptions (seeing people or objects that are not real). Physiological uncoordinated and impulsive movements. At this stage of panic the individual can experience fatigue. In general, panic disorder is characterized by anxiety attacks of about 15-30 minutes per episode. During a panic attack, the individual feels intense fear with palpitations, chest pain, feeling of suffocation, sweating, shaking, nausea, dizziness, unreal feeling, and fear of death. Panic attacks can occur spontaneously. The frequency varies for each individual.

2.3.4 Clinical Manifestations of Anxiety

Symptoms of anxiety can be classified into three symptoms by Tim POKJA PPNI (2017) namely:

2.3.4.1 Physical symptoms are disorders that occur in the physical, such as the body shaking, sweating profusely, racing heart, difficulty breathing, dizziness, cold hands, nausea, chills, more sensitivity, restlessness, nervousness, fainting, weakness, frequent urination, and diarrhea.

2.3.4.2 Behavioral symptoms are anxiety that causes a person's behavior to be different and lead to less usual things, such as avoidance behavior, dependency or clinging behavior, shaken behavior, and leaving situations that cause anxiety.

2.3.4.3 Cognitive symptoms for example: worrying about something, belief that something terrible will happen soon without a clear explanation, fear of not being able to solve problems, feeling confused or confused, thinking that you should be able to escape from the crowd, worrying about things. trivial things, worry about being left alone, and difficulty concentrating.

In addition, Maina *et al* (2016)mentions 4 symptoms of anxiety, as follows:

a. Physical symptoms appear in the form of profuse sweating, nervousness, stomach pain, cold hands and feet, no appetite, dizziness, difficulty breathing, fast heart beat, frequent urination, difficulty sleeping.
b. Emotional symptoms appear in the form of being very irritable, irritable, easily agitated, afraid, restless, and worried.
c. Cognitive symptoms appear in the form of worrying about something, forgetful, difficult to concentrate, difficult to think clearly, difficult to make decisions.
d. Behavioral symptoms appear in the form of avoidance, increased aversive responses to others, indifference, and decreased appetite.

Meanwhile, according to Tim POKJA PPNI (2017), there are several signs and symptoms of anxiety in a person, including:

1) Major signs & symptoms:

   Subjective: Feeling confused, feeling worried about the consequences of the conditions faced and difficult to concentrate. And for objective signs and symptoms are: looking restless, looks tense and hard to sleep.

2) Minor signs & symptoms:

Subjective: Complaining dizzy, anorexia, palpitations, feeling helpless. And for objective signs and symptoms are: Increased respiratory rate, increased pulse rate, increased blood pressure, diaphoresis, tremor, face looks pale, vibrating voice, bad eye contact, requent urination, oriented to the past.

2.3.5 Pathophysiology of Anxiety

The central nervous system receives a perception of threat. This perception arises as a result of external and internal stimuli in the form of past experiences and genetic factors. Then the stimulus is perceived by the five senses, transmitted and responded to by the central nervous system involving the cortex cerebri-limbic system-reticular activating system-hypothalamus pathway which gives impulses to the pituitary gland to secrete hormones such as cortisol, epinephrine and norepinephrine as well as hormonal mediators to target organs, namely the adrenal glands. which then triggers the autonomic nerves through other hormonal mediators which will trigger the sympathetic nervous system in terms of increasing heart rate and increasing respiration, so that it can trigger anxiety and feelings of restlessness (Adwas *et al*., 2019).

2.3.6 Anxiety Measurement Tool

One of the instruments that can be used to determine the degree of patient anxiety is mild, moderate, severe, a measuring instrument known as the Zung Self Rating Anxiety Scale (ZSAS) can be used. This scale was created by William W.K. Zung aims to assess anxiety as a clinical disorder and determine symptoms of anxiety. The Zung Self Rating Anxiety Scale (ZSAS) is a 20-item scale, containing the usual characteristics of anxiety disorders (15 increased anxiety responses and 5 decreased anxiety responses). This instrument is modified and has

been tested for validity and reliability. All statements are measured in 4 scores of them, namely 1: never, 2: sometimes, 3: often, 4: always.

The ZSAS scale cited Zung (1971) in Katerina *et al* (2017) assessment of anxiety consists of 20 items, including:

a. I feel more restless or nervous and anxious than usual
b. I feel scared for no apparent reason
c. I feel as if my body is falling apart or falling apart
d. I am easily angry, irritated or panicked
e. I always find it difficult to do anything or feel that something bad is going to happen
f. My hands and feet are shaking a lot
g. I am often bothered by headaches, neck pain or muscle aches
h. I feel my body is weak and tired easily
i. I can't rest or sit still
j. I feel my heart pounding hard and fast
k. I often experience dizziness
l. I get short of breath easily
m. I often faint or feel like passing out
n. I feel stiff or numb and tingling in my fingers
o. I have stomach pain or indigestion
p. I urinate more often than usual
q. I feel my hands are cold and often wet with sweat
r. My face feels hot and red
s. I have trouble sleeping and can't get a good night's rest
t. I have nightmares

Anxiety assessment methods will be classified into 4 levels of anxiety, which refers to the value obtained when calculating the level and range of scores as follows to Zung (1971) in Katerina *et al* (2017):

1) Score 20 = no anxiety
2) Score 21 – 40 = mild anxiety
3) Score 41 – 60 = moderate anxiety

4) Score 61 – 80 = severe anxiety

2.3.7 Anxiety Management

According to Adwas *et al* (2019) there are several forms of anxiety management, including:

2.3.7.1 Pharmacological management

Anti-anxiety medication, especially benzodiazepines, these drugs are used for the short term, and are not recommended for the long term because this medication causes dependence. Nonbenzodiazepine antianxiety drugs, such as buspirone (buspar) and various antidepressants are also used.

2.3.7.2 Non-pharmacological management

a. Distraction

Distraction is a method for relieving anxiety by diverting attention to other things so that the patient forgets the anxiety he is experiencing. Pleasant sensory stimuli cause the release of endorphins which can inhibit anxiety stimuli resulting in fewer anxiety stimuli being transmitted to the brain. Reading prayer is a distraction that can reduce stressor hormones, activate natural endorphins, and divert attention from fear, anxiety and tension, improve the body's chemical system, lower blood pressure and slow down breathing, heart rate, pulse, and brain wave activity. Slow respiration causes calm, emotional control, and a good metabolic system.

b. Relaxation

Relaxation therapy can be in the form of meditation therapy, imagination relaxation, visualization, progressive relaxation, and Benson relaxation therapy because this therapy can be applied quickly and effectively (Pangaribuan *et al*., 2020).

2.4 Benson's Relaxation Technique

2.4.1 Definition of Benson's Relaxation Technique

Benson's relaxation technique is a relaxation technique combined with the beliefs held by the patient, Benson relaxation will inhibit sympathetic nerve activity which can reduce oxygen consumption by the body and then the body's muscles become weak (Benson, H. and Proctor, 2000) in the Solehati & Kosasih, 2015). Benson relaxation is the development of a relaxation response method by involving the patient's belief factor, which can create an internal environment so that it can help patients achieve a higher state of health and well-being. This therapy is a relaxation technique by involving elements of belief in the form of words of belief held by the patient (Rohmawati *et al*., 2017).

2.4.2 Physiological Mechanisms of Benson's Relaxation Technique on Anxiety

Benson relaxation is done by doing a long inspiration which will slowly stimulate the stretch receptors of the lungs. This situation provides a signal which is then sent to the medulla oblongata which will provide information about increased blood flow. This information will be transmitted to the brain stem, as a result, the parasympathetic nerves have increased activity and the sympathetic nerves have decreased activity in the chemoreceptors, resulting in a decrease in blood pressure and heart rate and vasodilation in a number of blood vessels (Mitchell, 2013).

When a person experiences tension at work is the sympathetic nervous system. Activation of the sympathetic nervous system will result in an increase in heart rate, increased pulse, coronary artery dilatation, pupil dilation, bronchial dilatation and increased mental activation, while the parasympathetic nervous system works when

relaxing, thus relaxation can suppress tension, resulting in feelings of relax and disappearance. Feeling relaxed will be transmitted to the hypothalamus to produce Corticotropin Releasing Hormone (CRH) and Corticotropin Releasing Hormone (CRH) activates the anterior pituitary to secrete encephalin and endorphins which act as neurotransmitters that affect mood so that you become relaxed and happy. In addition, the anterior pituitary secretion of Adrenocorticotropic Hormone (ACTH) decreases, then Adrenocorticotropic Hormone (ACTH) controls the adrenal cortex to control cortisol secretion. Decreased levels of Adrenocorticotropic Hormone (ACTH) and cortisol cause stress and tension to decrease (Faruq *et al*., 2020).

2.4.3 Indications for Benson's Relaxation Therapy

Benson relaxation therapy can be done for everyone and can be done on the conditions of clients who experience anxiety, stress, depression, pain, insomnia even for clients with hypertension (Padillah, 2019).

2.4.4 Contraindications to Benson Relaxation Therapy

Basically Benson's relaxation therapy is relatively safe and has no absolute contraindications, it's just that this therapy can be relatively contraindicated in patients who experience disorders that cause them to be unable to follow instructions or are uncooperative, such as severe cognitive impairment and psychotic disorders. In addition, this therapy cannot be carried out by clients who experience a decreased level of consciousness and are in the phase of severe shortness of breath (Padillah, 2019).

2.4.5 Benson Relaxation Therapy Benefits

Benson's relaxation benefits have been shown to modulate stress-related conditions such as anger, anxiety, cardiac dysrhythmias, chronic pain, depression, hypertension and insomnia and induce feelings of calmness (Benson, H. and Proctor, 2000 in Mahdavi *et al*., 2013). In addition, Benson relaxation can be used to improve the quality of life among patients receiving hemodialysis, therefore, Benson relaxation techniques can be used to improve the quality of life of patients in hemodialysis units (Katerina *et al*., 2017).

Benson relaxation technique is a breathing exercise technique. The benefits of Benson relaxation if done correctly, namely the body will become more relaxed, relieve tension when experiencing stress and free from threats. Feeling relaxed will be transmitted to the hypothalamus to produce Corticotropin Releasing Factor (CRF). Furthermore, CRF stimulates the pituitary gland to increase the production of Proopiodmelanocortin (POMC) so that the production of enkephalin by the adrenal medulla increases. The pituitary gland also produces beta-endorphins as a neurotransmitter that affects the mood to relax. Deep breathing relaxation techniques also have other benefits, namely a decrease in cortisol, epinephrine, and norepinephrine levels which can cause hemodynamic changes, namely a decrease in blood pressure and pulse frequency (Agustiya *et al*., 2020).

2.4.6 Benson Relaxation Technique Therapy Procedure

In general, according to Mahdavi *et al* (2013), describes a brief procedure related to Benson relaxation therapy, namely:

2.4.6.1 Remain in a comfortable position

2.4.6.2 Close your eyes.

2.4.6.3 Calm and relax the body, relaxing from the toes to the top of the head.

2.4.6.4 Inhale through the nose and maintain awareness. Exhale from your mouth whenever you exhale, repeat one word, inhale, and exhale comfortably and confidently.

2.4.6.5 Do this for 10-15 minutes. Try to keep your body and muscles relaxed. Then slowly open your eyes and don't move for a few minutes.

2.4.6.6 Don't worry, it doesn't matter to what level of relaxation you have reached, relax your body and stay focused, don't pay attention to noises or distractions around if there are any.

Meanwhile, for a more complete procedure from the researcher's document, it can be seen in the appendix section.

2.4.7 Analysis of the Journal of Benson's Relaxation Therapy

Table 2. 2 Journal Analysis of Benson's Relaxation

Journal Title	Validity (V)	Important (I)	Applicable (A)
The Effect of Benson's Relaxation Technique on Anxiety, Depression and Sleep Quality of Elderly Patients Undergoing Hemodialysis	**Design:** This study used a quasi-experimental design with pre and post tests without control. **Sample & Sampling:** The number of respondents in this study were 92 elderly who underwent hemodialysis. Samples were taken using convenience sampling technique.	**Results:** From this study, the average age of the respondents is from the range of 60-92 years with a mean ± SD = 66,256 ± 6.78 years, and as many as 70.9% are male, all the average scores from the measurements of the hospital anxiety scale, depression scale, and The Pittsburgh sleep quality index for	Benson's relaxation technique is one technique that is better tolerated by CKD patients who routinely undergo hemodialysis. This technique is the most effective and easy to use nursing intervention method. These include mindfulness techniques that affect various physical and psychological

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	Inclusion & exclusion criteria: The sample involved in this study must meet the following criteria: - Aged 60 years or older, male or female - Able to communicate well - Undergoing hemodialysis therapy for at least the past 6 months and scheduled to undergo hemodialysis 2-3 times a week. - Elderly who have normal cognitive abilities score 24-30) and do not have physical problems such as paralysis or stroke. - Agree to participate in research. - Patients with kidney transplantation and undergoing peritoneal dialysis were not included in this study. **Measurement:** Measurements in this study used several instruments, including: - Mini-Mental State Examination (MMSE) - Socio demographic	elderly patients increased significantly after the Benson relaxation technique was applied (all measurements had a value = 0.001). **Conclusion:** The implementation of Benson's relaxation technique is very effective in reducing anxiety, depression, and improving sleep quality in elderly patients undergoing hemodialysis. There is a significant relationship between socio-demographic variables and decreased levels of anxiety, depression, and improved sleep quality.	signs and symptoms such as anxiety, pain, depression, mood and self-esteem, reduce stress and improve sleep quality in elderly patients undergoing hemodialysis through its complete effect on relaxing all muscles. Thus, the need to apply Benson's relaxation techniques in elderly patients seems necessary to reduce anxiety levels, depression, improve quality of life sleep and overall well-being. In addition, this technique is also classified as very easy to apply and very minimal side effects.

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	and Clinical Data Structured - Interview Schedule - Study Subject's Relaxation technique Knowledge - Hospital anxiety and depression scale: (HADS) - The Pittsburgh Sleep Quality Index (PSQI) **Purpose:** To determine the effect of Benson's relaxation technique on anxiety, depression and sleep quality in the elderly who are on hemodialysis therapy.		
Effect of Benson's Relaxation Technique on Mental Health and Quality of Life in Hemodialysis Patients: A Literature Review	**Design:** This study was conducted using a literature review of several electronic research databases, we focused on studies examining the effects of the Benson relaxation technique to reduce depression, anxiety, and stress and improve the quality of life of hemodialysis patients. The criteria for the studies included in this study were that they (a) be a randomized controlled trial (RCT) with a control group, and (b) be published in English in 2010-2018.	**Results:** Seven RCTs that met the eligibility criteria were reviewed. So it was found that the Benson relaxation technique had a significant positive effect in reducing depression, anxiety, and stress as well as improving the quality of life in the group of patients who routinely undergo hemodialysis. **Conclusion:** Benson relaxation is a very effective technique in	Benson's relaxation technique is relatively safe compared to other non-pharmacological treatments, because this technique uses a relaxed rhythm breathing technique consisting of several phases, namely slow breathing, deep breathing, meditation breathing, and abdominal breathing so that nurses can teach easily and patients can learn and apply easily and the results tained are very

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	Inclusion & exclusion criteria: The inclusion criteria in this study were the full text available in English; published in 2010-2018; which has an RCT design; there is a quasi-experimental pretest and posttest; have a control group; have the same results at the time of measurement (scores measured depression, anxiety, stress, and quality of life); and it's the same intervention (Benson relaxation technique). In this study, if there are only abstracts and case reports, they are not considered for use in this literature review study. **Measurement:** Various types of measurement scales were used in this study. Tool for measuring mental health problems (depression, stress, and anxiety) such as Depression, Anxiety, Stress Scale (DASS-21), Beck Depression Inventory (BDI), and Spielburger State Anxiety Inventory (STAI-S) and to measure QOL included the Quality of Life Index-dialysis version (QLI) and Kidney	treating depression, anxiety, and stress and improving the quality of life of patients undergoing hemodialysis. The study recommends that the Benson relaxation technique be routinely used as an alternative therapy to reduce depression, anxiety, and stress and improve the quality of life of patients undergoing hemodialysis.	beneficial for body relaxation.

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	Disease Quality of Life Short Form (KDQOLSF). **Purpose:** To determine the effect of Benson's relaxation technique on anxiety, depression and quality of life of patients on hemodialysis therapy.		
Relaksasi Benson Menurunkan Tingkat Kecemasan pada Pasien Gagal Ginjal Kronik yang Menjalani Hemodialisis	**Design:** This study is a quantitative study with a quasi-experimental design using a pre-post test design with a control group **Sample & Sampling:** The sample in this study were patients with chronic renal failure undergoing hemodialysis who experienced anxiety. Sampling using purposive sampling with the number of respondents 56 people. The sample in this study amounted to 28 people for the intervention group and 28 people for the control group. **Inclusion & exclusion criteria:** Respondents' inclusion criteria were patients who undergo Hemodialysis 2 x a week, aware and has a good orientation, Able to	**Results:** The results of statistical tests using Paired samples t test showed that there was an effect of Benson relaxation on the anxiety level of patients undergoing hemodialysis, with Sig. (2-tailed) 0.000 where if the probability value is <0.05 then the hypothesis or H0 is rejected. **Conclusion:** Conclusion of research on Benson relaxation in patients with chronic renal failure undergoing hemodialysis showed a significant difference in anxiety levels before and after Benson relaxation (p value 0.000).	The Benson relaxation technique intervention is an intervention that is very easy to apply by nurses in the room, especially to overcome anxiety in patients who are rarely studied by nurses and other health workers .

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	sit, willing to be a respondent, has a level of anxiety from mild to severe and is Muslim. **Measurement:** Anxiety in hemodialysis patients was measured using the Hamilton Anxiety Rating Scale (HARS) which has a total range of 0-56, less than 14 = no anxiety; 14-20= mild anxiety; 21-27= moderate anxiety; 28-41= severe anxiety;42-56 = very severe anxiety. **Purpose:** To determine the effect of Benson's relaxation on anxiety levels in patients with chronic kidney failure who suffer from chronic kidney disease undergoing hemodialysis		