CHAPTER 2
LITERATURE REVIEW

2.1 Chronic Kidney Disease (CKD)

2.1.1 Definition

Chronic Kidney Disease (CKD) is defined as a structural abnormality of kidney function, present for more than 3 months. CKD is a conventional term for a variety of heterogeneous problems that result in sustained kidney damage with implications for individual health (Ikizler, 2019).

Chronic kidney disease (CKD) is a syndrome defined as a persistent change in kidney structure, function or both with implications for an individual's health. Examples of structural abnormalities include cysts, tumors, malformations and atrophies, which are evident in imaging. In contrast, kidney dysfunction can manifest as hypertension, edema, changes in urine output or quality and growth delays in children; These changes are most commonly recognized by elevated levels of serum creatinine, cystatin C or blood urea nitrogen (Romagnani, 2017).

Chronic kidney disease (CKD) is defined as a glomerular filtration rate (GFR) <60 mL/min per 1.73 m^2 or marker of kidney damage, or both, at least the duration of months (panels). When the GFR is less than 15 mL/min per 1.73m^2, a person has reached end-stage kidney disease (ESKD), at which point kidney function is no longer able to sustain life in the long run (Webster, 2017).

It can be inferred from the above 3 definitions that CKD is a structural abnormality of kidney function that appears over 3 months with a glomerular filtration rate of <60 mL / min per 1.73 m2 and if it is less than 15 mL / min per 1.73m2, a person has reached end-stage renal disease.

2.1.2 Etiology

In the United States, most cases of CKD (up to 80%) are secondary to diabetes or hypertension. This systemic disease and its contribution to CKD are growing worldwide. The WHO estimates that about one billion people are now classified as overweight or obese. Despite its affiliation with diabetes and hypertension, weight problems are associated with earlier onset and faster development of CKD at a time-honored time and glomerulonephrhythides in particular (Arici, 2014).

In developing countries, chronic glomerulonephritis (GN) and interstitial nephritis are common causes of CKD, in many cases reflecting secondary kidney disease to bacterial, viral, and parasitic infections. Infectious agents involved include tuberculosis (200 million affected worldwide), streptococcal infections, hepatitis C virus (170 million), human immunodeficiency virus (40 million), and schistosomiasis (200 million), depending on the region. IgA nephropathy is common in Southeast Asia and the Pacific region (accounting for up to 35-45% of glomerulonephrocytes) (Arici, 2014).

Focal segmental glomerulosclerosis (FSGS) is another common cause of CKD in developing countries such as India, possibly due to the low nephron mass associated with low birth weight. Finally, the importance of environmental pollution's contribution to CKD remains debatable: an association has been documented only for occupational exposure to lead, cadmium, and mercury (Arici, 2014).

The following are the risk factors for CKD according to (He, 2020):

2.1.2.1 Clinical factors

a. Diabetes
b. Hypertension
c. Autoimmune diseases

d. Systemic infection
e. Urinary tract infection
f. Urinary stones
g. Obstruction of the lower urinary tract
h. Urolithiasis
i. Genetic
j. Recovery from acute kidney injury
k. Reduction of kidney mass
l. Exposure to certain medications
m. Low birth weight

2.1.2.2 Sociodemographic Factors

a. Older age
b. Exposure to certain chemical and environmental conditions
c. Low income / education

2.1.3 Clinical Manifestation

Chronic kidney disease (CKD) is generally a silent condition. Signs and symptoms, if any, are generally nonspecific and unlike some other chronic diseases (such as congestive heart failure, chronic obstructive pulmonary disease), they do not expose clues to the diagnosis or severity of the condition. Typical symptoms and signs of uremia are present almost never in the early stages and develop late in only a few patients during CKD. However, all newly diagnosed CKD patients, patients with acute deterioration in their kidney function, and CKD patients on regular follow-up should have a history of focus and physical examination. This will be the basis for feeling the real "health implications" associated with decreased kidney function in CKD (Arici, 2014).

According to (Arici, 2014), the signs and symptoms of CKD are divided into 2, namely:

2.1.3.1 Symptoms and Signs of Early Stage CKD

a. Debilitation
b. Decreased appetite
c. Nausea
d. Changes in urination (nocturia, polyuria, frequency)
e. Blood in urine or urine is dark in color
f. Foamy or bubbly urine
g. Back pain
h. Edema
i. Hypertension
j. Pale skin

2.1.3.2 Symptoms and Signs of Late Stage (Uremic) CKD

a. Common (lassitude, fatigue, high blood pressure, signs of excessive volume, decreased mental acuity, harsh hiccups, uremic fetor)
b. Skin (pale appearance, uremic frost, pruritic excoriations)
c. Lung (dyspnea, pleural effusion, pulmonary edema, uremic lung)
d. Cardiovascular (rubbing pericardium friction, congestive heart failure)
e. Gastrointestinal (anorexia, nausea, vomiting, weight loss, stomatitis, bad taste in the mouth)
f. Neuromuscular (muscle twitching, peripheral sensory and motor neuropathy, muscle cramps, restless legs, sleep disorders, hyperreflexia, seizures, encephalopathy, coma)
g. Endocrine-metabolic (decreased libido, amenorrhea, impotence)
h. Hematologic (anemia, bleeding diathesis)

2.1.4 Pathophysiology and Pathway

The pathophysiology of CKD initially depends on the underlying disease, but in later development, the process occurs more or less the

same. Reduction in renal mass results in structural and functional hypertrophy of nephrons (surviving nephrons) as a compensatory measure, which is mediated by vasoactive molecules such as cytokines and growth factors (He, 2020).

This leads to hyper filtration, which is followed by an increase in capillary pressure and glomerular blood flow. This adaptation process is short, finally followed by the maladaptation process in the form of nephron sclerosis left. This process is eventually followed by a progressive decrease in nephron function, although the underlying disease is no longer active. Increased activity of intra-renal renin-angiotensin-aldosterone contributes to the occurrence of hyperfiltration, sclerosis and progressivity. Long-term activity of the renin-angiotensin-aldosterone axis, partially mediated by growth factors such as altering β growth factors (TGF-β).

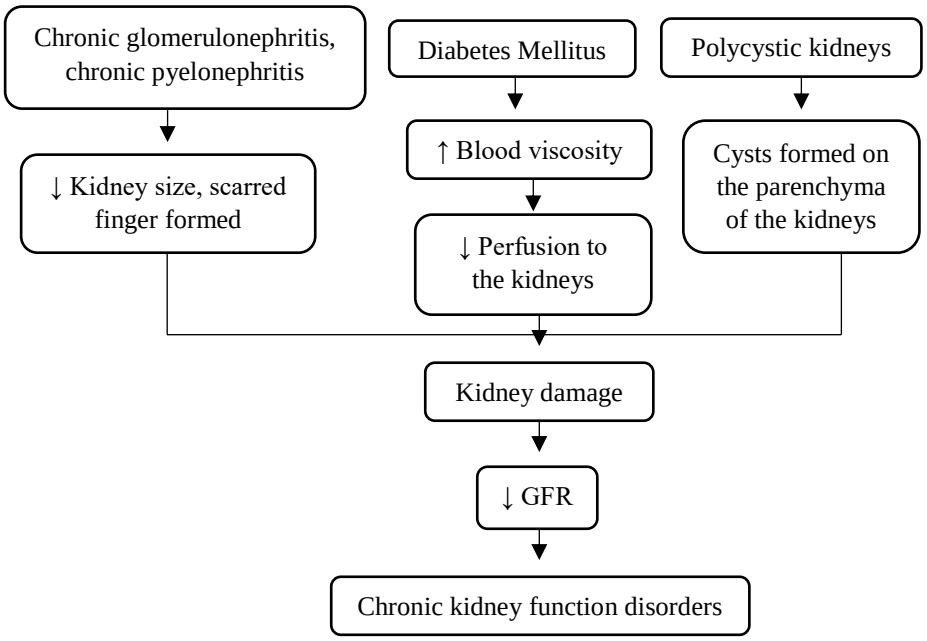
In the early stages of CKD, there is a loss of kidney reserve, in which the basal GFR state is still normal or even increased. Then slowly but surely, there will be a progressive decrease in the function of nephrons, which is characterized by an increase in urea and serum creatinine levels (Arici, 2014).

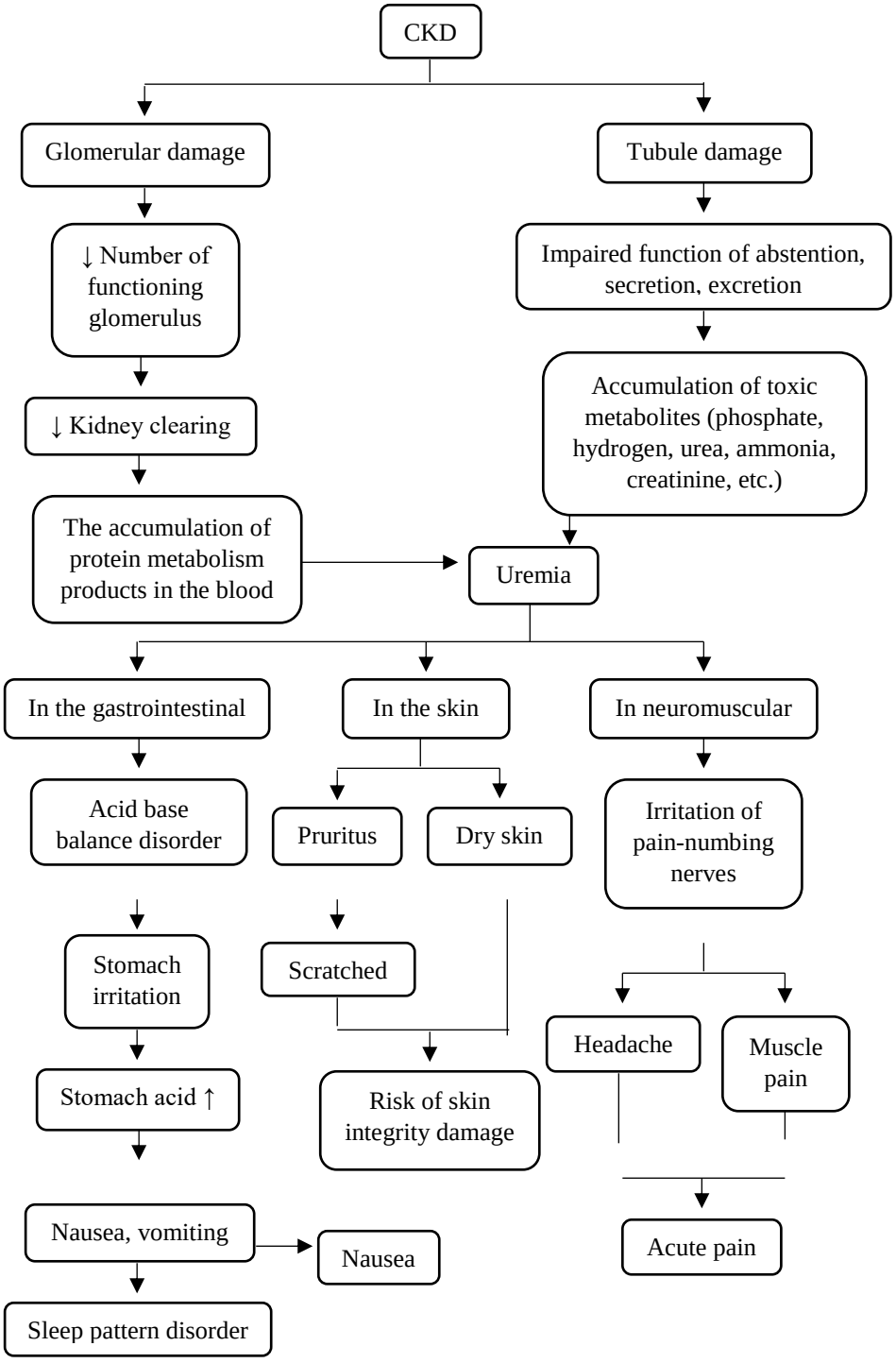
Up to 60% GFR, patients still do not feel complaints (asymptomatic), but there has been an increase in serum urea and creatinine levels. Up to 30% GFR, there began to be complaints in patients such as, nocturia, weak body, nausea, lack of appetite and decreased body health. Up to a GFR below 30%, patients show symptoms and signs of real uremia such as anemia, increased blood pressure, phosphorus and calcium metabolic disorders, pruritus, nausea, vomiting and so on.

Patients are also susceptible to infections such as urinary tract infections of airway infections, as well as gastrointestinal infections. There will also be water balance disorders such as hypovolemia or hypervolemia,

disruption of electrolyte balance such as sodium and potassium. At a GFR below 15%, there will be more serious symptoms and complications, and patients already need kidney replacement therapy such as dialysis or a kidney transplant. In this condition, the patient is said to arrive at the stage of kidney failure (Kallenbach, 2016).

Pathway CKD according to (He, 2020) moditification (Nurarif, 2020)





2.1.5 Supporting Examination

Patients with chronic kidney disease may undergo exactly the same screening tests as patients with normal kidney function with one notable

exception, namely when glomerular function is part of tests such as renography, intravenous urography, CT urography, and magnetic resonance urography where the excretion of contrast of substances is part of the integral test for examination (Arici, 2014).

2.1.5.1 Conventional radiography

A plain film of the urinary tract provides information about calcification inside and outside the urinary tract as well as various medical devices, for example, nephrozytomy tubes, double J-stents, and artificial sphincters. As in other patients, chest X-rays are used to evaluate heart size, pulmonary congestion, pneumonia infiltration, pneumothorax, catheter location, and pleural fluid.

Visualization of the urinary tract (lumen) can be done using conventional imaging methods such as direct pyelonography in which a contrast medium is injected through a percutaneous inserted catheter (nephrozytomy) or through a catheter placed in the ureter during cystoscopy. These examinations are called antegrade pyelography and retrograde pyelography, respectively.

2.1.5.2 CT Imaging

CT imaging can be done with or without intravenous administration of iodine-based contrast media (CM). Unassisted CT imaging can be performed on CKD patients without special precautions, while studies of improved contrast may lead to contrast nephropathy. Due to the risk of contrast nephropathy, the role of enhanced CT imaging in CKD patients is limited.

2.1.5.3 Ultrasonography (USG)

USG is often used in patients with decreased kidney function. It provides information about the size of the kidneys and the presence of hydronephrosis. CKD patients should be referred

to a kidney USG if they experience (1) progressive CKD (decreased eGFR of more than 5 ml/min/1.73 m2 in 1 year or more than 10 ml/min/1.73 m2 in 5 years), (2) have visible or persistent hematuria, (3) have symptoms of urinary tract obstruction, (4) have a family history of polycystic kidney disease and are over 20 years old, (5) have stage 4 or 5 CKD, or (6) be considered by a nephrologist to require a kidney biopsy.

2.1.5.4 MR Imaging

MRI can be used to describe the urinary tract in CKD patients. Similar to CT, MRI can be used to evaluate structural abnormalities such as tumors, cysts, and obstructions. However, compared to CT, MRI is relatively insensitive to detect urinary tract stones, so an unharmed CT can complement an MRI.

2.1.5.5 Angiography

Conventional X-ray angiography, usually done through the femoral artery, is rarely used for diagnostic studies after the introduction of CTAs and MRAs. However, conventional angiography combined with interventional procedures (percutaneous transluminal angioluminal angioplasty - PTA) can be applied to the treatment of renal artery stenosis.

2.1.6 Management

According to Yang & He (2020), CKD management begins with providing education to patients and offering information tailored to the causes, severity, and complications of CKD and developmental risks. Instruct the patient to exercise, lose weight and stop smoking. Offer dietary advice on salt, potassium, calorie, and phosphate intake according to the severity of CKD.

For individuals with CKD, aim to keep blood pressure below 140 (target range, 120-139 mmHg) / 90 mmHg. For those with diabetes and ACR ≥70 mg/mmol, aim to keep blood pressure below 130 mmHg (target range, 120-129 mmHg) / 80 mmHg. For CKD patients suffering from diabetes, glycemic control should be accompanied by multifactorial intervention strategies including blood pressure control and cardiovascular risk treatment. The use of RAS antagonists, statins, and antiplatelet therapy is recommended where clinically indicated. Provide patients with stage 5 CKD with information about healing preferences for kidney replacement therapy. Treatment options consist of transplantation and dialysis (hemodialysis and peritoneal dialysis) (Kallenbach, 2016).

2.2 Diabetes Mellitus (DM)

2.2.1 Definition

Diabetes mellitus, more commonly called diabetes is a heterogeneous chronic metabolic disorder characterized in principle by persistent hyperglycemia due to defects in the work of insulin and/or secretion. Diabetes mellitus consists of a group of chronic metabolic disorders involving major metabolic fuels, carbohydrates, fats and proteins. This disorder is caused by an absolute or relative deficiency of insulin secretion that is often accompanied by a defect in the work of insulin (Chandalia, 2014).

Diabetes mellitus is a serious chronic disease that occurs when the pancreas does not produce enough insulin (the hormone that regulates blood glucose), or when the body cannot effectively use the resulting insulin. Insulin is an essential hormone produced in the pancreas. This allows glucose from the bloodstream to enter the body's cells to be converted into energy. Insulin is also important for protein and fat metabolism (IDF, 2019).

Type 2 diabetes mellitus is a metabolic disorder in which the body's cells are resistant to the action of insulin being produced and over time insulin production decreases. Chronic diseases such as diabetes mellitus are very susceptible to impaired function in the organs of the eyes, kidneys, nerves, heart and blood vessels (WHO, 2019).

The above definition can be concluded that DM is a disorder of insulin function including chronic diseases that cannot be cured and require serious treatment to prevent complications and improve intervention.

2.2.2 Etiology

2.2.2.1 Insulin-dependent diabetes mellitus

a. Genetic factors

Diabetics do not inherit type 1 diabetes itself but inherit a predisposition or genetic predisposition towards the occurrence of type I diabetes. HLA is a collection of genes responsible for transplanted antigens and other immune processes.

b. Immunological factors

In type 1 diabetes there is evidence of an autoimmune response. This is an abnormal response in which antibodies are directed at the body's normal tissues by reacting to those tissues that it perceives as foreign tissue.

c. Environmental factors

External factors that can trigger the destruction of cells β pancreas, for example the results of investigations state that certain viruses or toxins can trigger autoimmune processes that can cause destuction of cells β the pancreas (DeFronzo, 2018)

2.2.2.2 Non insulin dependent diabetes melitus

Exactly the cause of T2DM is not yet known, genetic factors are thought to play a role in the process of insulin resistance.

Diabetes mellitus is not dependent on insulin the disease has a strong familiar pattern. Diabetes is characterized by abnormalities in insulin secretion as well as in the work of insulin. At first there appears to be resistance from the target cells to the work of insulin. Insulin first binds itself to specific cell surface receptors, then there is an intracellular reaction that increases the transport of glucose through the cell membrane. In patients with diabetes there are abnormalities in the binding of insulin with receptors. This can be caused by a reduced number of insulin-responsive receptor sites on the cell membrane. As a result, there is an abnormal merger between the insulin receptor complex and the glucose transport system. Normal glucose levels can be maintained for a considerable time and increase insulin secretion, but in the end circulating insulin secretion is no longer adequate to maintain euglycemia (DeFronzo et al., 2018). T2DM is also called Non Insulin Dependent Diabetes Mellitus which is a group that is often found in adults, but can sometimes arise in childhood.

Risk factors associated with the process of occurrence of T2DM, according to (Chandalia, 2014) among them are:

a. Age (insulin resistance tends to increase by age over 65)
b. Obesity
c. Family history
d. Ethnic groups

2.2.3 Clinical Manifestation

According to (Muller-Wieland, 2019) symptoms that are common in diabetes mellitus in the early stages are often found as follows:

2.2.3.1 Poliuri (peeing frequently)

DM is usually characterized by high blood sugar levels above 160-180 mg / dl so that it will reach the urine. Glucose that

reaches the urine if it increases high will trigger the kidneys to waste additional water to dilute the glucose because of the sugar properties that attract water resulting in polyuria or a lot of urine.

2.2.3.2 Polydipsi (drinking a lot)

This is due to burning too much and losing a lot of fluid due to polyuri, so to offset having to drink more.

2.2.3.3 Polypghagia (eating a lot)

This is because glucose does not reach the starved (hungry) cells. So to fulfill it is recommended to continue eating. But even if you eat a lot, still the food will only be in the blood vessels.

2.2.3.4 Weight loss, weakness and fatigue quickly

This is due to running out of glycogen that has been melted into glucose, then the body tries to get a melting of substances from other parts of the body, namely fat and protein, because the body continues to feel hungry then the body including those in muscle tissue and fat so that patients with dm eat a lot will remain thin.

2.2.3.5 Blurred eyes

It is caused by cross interference (glucose-sarbitol fructation) caused due to insulin insufficiency. As a result there is a hoarding of sarbitol from the lens, causing the formation of cataracts.

2.2.4 Pathophysiology

Most of the pathological picture of DM according to (Muller-Wieland, 2019) can be attributed to one of the main effects due to the following lack of insulin:

2.2.4.1 Reduced use of glucose by the body's cells resulting in an increase in blood glucose concentrations as high as 300 - 1200 mg / dl.

2.2.4.2 Increased fat mobilization from fat storage areas that cause abnormal fat metabolism accompanied by cholesterol deposits on the walls of blood vessels.

2.2.4.3 Reduced protein in body tissues.

Patients with insulin deficiency are unable to maintain normal fasting plasma glucose levels or tolerance after meals. In severe hyperglycemia that exceeds the normal renal threshold (blood glucose concentration of 160 – 180 mg / 100 ml), glucosuria will arise because the renal tubules cannot reabsorb all glucose. This glucosuria will result in osmotic diuresis which can cause polyuri accompanied by loss of sodium, chloride, potassium, and pospat. The presence of polyuri causes dehydration and polydipsi arises. Due to glucose that comes out with the urine, the patient will experience a negative protein balance and decreased weight and tend to occur polypphagy. Another result is astenia or lack of energy so that the patient becomes rapidly and drowsy caused by the reduction or loss of body protein and also the reduced use of carbohydrates for energy (DeFronzo, 2018).

2.3 The Concept of Nausea in CKD Patients

2.3.1 Definition

Feelings of discomfort in the back of the throat or stomach that can result in vomiting (PPNI, 2017).

2.3.2 Etiology

Sensation in the form of nausea caused by stimulation of the four systems, namely (Price, 2006):

2.3.2.1 Visceral afferent of the digestive tract (vagus or sympathetic nerve signals this signal informs the brain about conditions such as gastrointestinal distension and mucosal irritation).

2.3.2.2 Visceral afferents from outside the digestive tract signal from the bile ducts, peritoneum, liver and various other organs.

Impulses to the center of the vomiting center explain how, for example, chronic kidney failure can cause nausea.

2.3.2.3 Afferents from the extramedulla center in the brain (vestibular system), certain psychic stimuli (smell, fear), and brain trauma can cause nausea.

2.3.2.4 Kemoreceptors trigger zone in the postrema (medulla) area of the fourth ventricular base, or higher centers in the central nervous system (CNS).

The digestive tract can activate the vomiting center by stimulation of mecancer or kemoreceptors on the glossopharyngeal or afferent vagal (cranial nerves IX and X) or by the release of serotonin from enterochromaffin intestinal cells, which in turn stimulate serotonin receptors (5-HT3) in the vagal afferent. The vestibular system activates the vomiting center if stimulated by movement or disease (e.g. labyrinthitis) or when sensitive to medications (e.g. opioids). Histamine (H1) and Acetylcholine M1 receptors appear on the vestibular afferent. Endogenous or exogenous toxins that pass through the blood can activate kemoreceptors in the fourth ventricular floor postrema through this type of dopamine receptor 2. Finally, a higher CNS center can activate the vomiting center (Permatasari, 2011).

2.3.3 Factors that affect nausea

Based on the efferent impulses that can stimulate the vomiting center, there are various factors associated with nausea, namely patient factors, surgical factors, and anaesthetic factors (Price, 2006).

2.3.3.1 Patient factors

Patients with risk factors for nausea are not smoking, a history of post operative nause and vomitting (PONV) or motion sickness. Patients with gastrointestinal disorders such as hiatus hernias, gastroesophageal reflux, or metabolic disorders of

diabetes militus, uremia and electrolyte disorders are also at high risk of nausea.

2.3.3.2 Surgical factors

Increased duration of surgery due to prolonged surgery there is nausea due to the length of exposure with anesthetic drugs that are emetogenic.

2.3.3.3 Anesthesia factor

Anesthesia factors that affect the occurrence of nausea include anesthesia techniques, the choice of anesthetic drugs, the ability to administer intravenous fluids and postoperative pain treatment. Hypotension that occurs during induction and surgery is associated with an increased risk of nausea.

2.3.4 Pathophysiology

Chronic kidney failure is characterized by a high ureum that is acidic. Proximal and distal tubule cells are the same as cells of the stomach glands, excreting hydrogen ions. Acidification also occurs in the kilongentes duct. In this part of the tubules some of the H+ is secreted through a proton pump driven by ATP. Renal acid secretion due to intracellular pco2 changes, K+ levels. High levels of ureum that are acidic in the blood cause kidney disorders in infiltrating the blood. The acidic ureum stimulates the parasympathetic nerve of the vagus nervus which together with the vagus esophagus penetrates the diaphragm so that it arrives in the abdominal room. Resulting in neuro toxic reactions in the vagus nervus nerve (Mardjono, 2016). Impul efferent from the receptor to the fidly and passed to the efferent nerve in the vagus nerve that acts directly on the oxytic cells to increase acid secretion (Permatasari, 2011). The acid that reaches the abdomen is secreted by histamine stimulated by gastrin. Gastrin cells are one of the enteroendocrine cells located in the antrum of the pylorus and function to excrete the hormone gastrin. Gastrin secretion is influenced by

several factors, including the presence of food (protein) in the stomach and vagus stimulation.

Gastrin is absorbed into the blood and in the lower oxyscintic glands inside the corpus of the stomach. Here gastrin stimulates parietal cells strongly as well as peptic cells. Thus, gastrin plays an important role in increasing the speed of secretion of hydrochloric acid by parietal cells. Then hydrochloric acid triggers enteric reflex activity that not only increases the secretion of hydrochloric acid more lanju, but also secondaryly stimulates the secretion of enzymes by peptic cells up to two to four times. In addition, gastrin stimulates pancreatic enzyme secretion and liver bile flow, increases the resting tone of the lower esophageal sphincter, and inhibits gastric emptying (Permatasari, 2011). Increased stomach acid causes nausea in CKD patients (Ganong, 2008).

2.3.5 Clinical manifestations

The main data from several sources are:

2.3.5.1 Complaining of nausea

Complaining or feeling nausea is an unpleasant feeling that exists before vomiting, this is usually accompanied by sweating, increased salivation, and contraction of the muscles of the abdominal wall (Bare.B., 2010).

2.3.5.2 The onset of vomiting desire

The desire to vomit is a feeling or urge from inside the stomach that is not realized and its discharge through the esophagus until it is mouthed. This condition causes the contents of the stomach to be forcibly removed through the stomach (Sudoyo, 2006).

2.3.5.3 Not interested in eating

Not interested in eating is caused by factors of sadness, depression and excessive anxiety. In addition, in patients with

chronic kidney failure due to high amino acids in the ureum interferes with the control system in the brain so that it results in a decrease in appetite in CKD patients (Sudoyo, 2006).

2.4 Concept of Nursing Care in CKD Patients

2.4.1 Assessment

2.4.1.1 Patient Identity

The identity of patients commonly studied includes name, age, gender, address, education and occupation.

2.4.1.2 Main Complaints

Usually clients come with the main complaints obtained varying, ranging from urine output slightly to unable to bak, restless to decreased consciousness, not appetite (anoreksi), nausea, vomiting, dry mouth, fatigue, smelly breath (ureum), and itching on the skin (Nurarif, 2015).

2.4.1.3 History of The Disease Now

Usually there is a decrease in urine output, decreased consciousness, changes in breathing patterns, physical weakness, skin changes, the presence of ammonia-smelling breath, and changes in nutrient fulfillment. Wherever the client asks for help to overcome the problem and get what treatment (Nurarif, 2015).

2.4.1.4 History of The Disease First

Usually there is a history of acute failure kidney failure, urinary tract infections, heart pain, the use of nephrotoxic drugs. Benign Prostatic Hyperplasia, and prostatectomy. And usually there is a history of urinary tract stone disease, recurrent infection of the reproductive system, diabetes mellitus, and hypertension in the previous period which became the presyposition of the cause. It is important to be

studied about the history of past drug use and the history of allergies to this type of drug and then document it (Arif, 2014).

2.4.1.5 Family History of Disease

Usually clients have family members who have suffered from the same disease as clients, namely CKD, as well as diabetes mellitus and hypertension which can be a triggering factor for the occurrence of CKD disease.

2.4.1.6 Physical Examination

The general state of clients who experience CKD is usually weak. Awareness of the client's state usually decreases according to the level of uremia which can affect the central nervous system. Vital respiratory signs usually increase. Blood pressure is found to be hypertensive.

2.4.1.7 Head To Toe Check

Head to toe examination is an examination that is done thoroughly from head to toe to find out if there are abnormalities or not.

2.4.2 Nursing diagnosis

A nursing diagnosis is a clinical assessment of a human response to a health disorder/life process, or coolness to that response from an individual, family, group, or community. A nursing diagnosis usually contains two parts: (1) descriptor or changer and (2) the focus of diagnosis, or the key concept of diagnosis (NANDA-I, 2018-2020).

Many nursing diagnoses that will arise accompany a health problem. The diagnosis that arises can be taken in accordance with the results of the analysis of data found after conducting an assessment of the client. Related to CKD problems, nursing diagnoses that may appear include: 1) Nausea, 2) Sleep Pattern Disorders (NANDA-I, 2018-2020).

Some nursing diagnoses that arise with CKD problems based on the (NANDA-I, 2018-2020) Diagnosis reference will be explained as follows:

2.4.2.1 Nausea related to biochemical disorders.

2.4.2.2 Sleep pattern related to gastrointestinal disorders.

2.4.3 Nursing intervention

Nursing planning is a collection of action plans made by nurses that will be implemented in concrete actions by exerting all their abilities for health improvement. Nursing planning consists of objectives (general and specific), intervention plans, and evaluation plans containing 40 criteria and standards. The formulation of goals is carried out specifically, measurable, achievable (achivable), rational and indicate time (SMART). This intervention plan is set to achieve the goal (Padila, 2013).

2.4.4 Implementation of nursing

The implementation of nursing is the process by which nurses get the opportunity to implement a plan of action that has been drawn up and arouse the interest and independence of the family in making improvements towards healthy living behaviors. But before implementing, nurses first make contracts so that clients and families are better prepared both physically and psychologically in receiving nursing care provided

2.4.5 Nursing evaluation

The evaluation stage can also be done formatively and summatively. Formative evaluation is an evaluation carried out during the nursing care process while a summative evaluation is an evaluation carried out at the end of nursing care (Mubarak, 2012).

2.5 Basic Concepts of Aromatherapy

2.5.1 Definition of aromatherapy

Aromatherapy is a therapeutic action by using essential oils that are useful to improve physical and psychological conditions so that the better. Each essential oil has unique pharmacological effects, such as antibacterial, antiviral, diuretic, vasodilator, sedative, and adrenal stimulation (Kusparlina, 2019).

Aromatherapy comes from the word aroma which means fragrant or fragrant, and therapy that can be interpreted as a way of treatment or healing. So aromatherapy can be interpreted as a way of treating the body or curing diseases by using essential oil (essential oil) (Briggs, 2016).

Aromatherapy is part of complementary therapies. According to Synder, M., & Lindquist (2016) modality therapy is very appropriate as part of nursing interventions where complementary therapy one of them aromatherapy combines the value of sensory experiences such as smells, a sense of touch that comes from botany and herbs.

Aromatherapy is an alternative treatment that uses smells or fragrances derived from aromatic compounds. The odor response resulting from aromatherapy will stimulate the work of brain neurochemical cells. Therefore, a pleasant smell will stimulate the thalamus to secrete enfekalin which serves as a natural pain reliever and produces a feeling of calm.

2.5.2 Benefits of aromatherapy

Aromatherapy is used to affect a person's emotions and help relieve symptoms of the disease. Essential oils used in aromatherapy are intended to reduce stress, improve blood circulation, relieve pain, reduce swelling, reduce vomiting nausea, and insomnia disorders (Santi, 2013).

2.5.3 Various kinds of aromatherapy

2.5.3.1 Eucalyptus oil aromatherapy

Eucalyptus oil is one type of essential oil typical of Indonesia. This oil is known to have many properties, both for external medicine and internal medicine so much needed by various circles of society. Aromatherapy eucalyptus oil also has properties to overcome nausea and vomiting. This is because it contains 1 to 6% essential oils, consisting of 50-60% anethole, about 20% fencon, curs, limonen, dipenten, felandren, methylchavikol, anisaldehyde, acid acid and 12% fatty oil. The content of anetol has a distinctive aroma, so it is useful to treat abdominal pain (heartburn), flatulence (carminative), feelings of fullness in the stomach, nausea, vomiting, and diarrhea. Aromatherapy provides a variety of effects for the inhaler. Such as calmness, freshness, and even help overcome nausea (Kusparlina, 2019).

2.5.3.2 Lemon oil aromatherapy

Aromaterai lemon oil is an essential oil produced from lemon peel extract (lemon cytrus) that is often used in aromatherapy.

2.5.3.3 Lavender aromatherapy

Lavender oil has a lot of potential because it consists of several ingredients such as hydrocarbon monoterpene, camphene, limonene, geraiol, lavandulol, and nerol. Lavender oil mostly contains linalool and linalool acetate with an amount of about 30-60% of the total oil weight, where the main content of lavender flowers is linalool for relaxation and prevent nausea.

2.5.3.4 Peppermint

Peppermint is a native herb that comes from mediterrania and grows in european and northern American states where menthol content is the most common found from peppermint

leaves with a concentration of 50-60% which has many uses such as reducing shortness of breath, headaches, nausea vomiting and muscle pain. Peppermint or Mentha Piperita is a plant containing essential oils whose main component is menthol with a concentration of 50-60%. Menthol produces a cooling effect on the skin, menthol reduces pruritus caused by histamine. It has antipruritic, analgesic and relaxing effects (Briggs, 2016).

2.5.4 Cons of aromatherapy indications

Counter indications according to (Briggs, 2016) From using aromatherapy are:

2.5.4.1 Increases the risk of heart disease

Steam from essential oils can indeed reduce stress but according to a study published by the eurupan journal of preventive cardiology, this can be harmful to your health.

2.5.4.2 Asthma

The content of volatile organic compounds (VOCs), organic ingredients that are volatile in the form of liquids contained in aromatherapy, will have an impact on the increased risk of inflammation in the body, disrupt the nervous system and can cause respiratory tract allergies.

2.5.5 Limitations on the use of aromatherapy

The limits for the use of eucalyptus oil aromatherapy to reduce nausea are not yet known with certainty. But according to Brent A Baurer MD internal medicine doctor and director of mayo clinik complomentary and integrative medicine program said if used incorrectly there are harmful consequences of essential oils, the article is as healthy as any substance, in addition to beneficial effects there are certainly negative effects that can be caused (Briggs, 2016).

2.5.6 Methods and uses

How to use aromatherapy there are 5 according to Synder & Lindquist (2016), namely:

2.5.6.1 Inhaled

It is one of the ways introduced in the simplest and fastest use of aromatherapy. Inhalation is also the oldest method. Aromatherapy enters from outside the body into the body with one easy stage, namely through the lungs flowed into the blood vessels through the alveoli. Inhalation is the same as the smelly method, where it can easily stimulate the olfactory at every time you breathe and will not interfere with normal breathing when you smell a different smell than essential oils. Inhalation aromatherapy can be done using an electric, battery, or wax diffuser, or placing a small amount of aromatherapy on a piece of cloth, cotton or tissue. It is useful for essential oils of relaxation and tranquilizers.

2.5.6.2 Evaporation

The tool used to spread aromatherapy by evaporation has a cave-like cavity to put a small candle or oil lamp and the top there is a hollow like a cup usually made of brass to put a little water and a few drops of essential oil. The way to use it is to fill the cup basin on the furnace with water and add a few drops of essential oil, then light a candle, oil lamp or electricity. Once the water and oil become hot, evaporation occurs and the whole room will be filled with aromatic odors.

2.5.6.3 Massage

Massage is one form of treatment that is highly collaborated with aromatherapy. A few drops of essential oil are mixed in the oil for massage so that it can provide a simultaneous effect between touch therapy and fragrance therapy. Massage can

improve blood circulation, restore muscle suppleness, remove toxins and release energy trapped inside the muscles. The fragrance triggers a feeling of happy and healthy.

2.5.7 Journal analysis

Table 2.1 Journal analysis

No	Journal title	Validty	Important	Appl
1	Aromatherapy Cajuput Oil for Emesis Gravidarum	Design: The study used a cross sectional approach. Population: In this study the population was all the first trimesters of pregnant women who experienced nausea. Number of samples: 17 pregnant women were taken using total sampling.	From the results of the study obtained the median value before conducting the study is 4.00 and the maximum minimum value is 5-2, while the results after the study are with a median value of 2.00 and a minimum value of 4-1 in obtaining a P-value of 0.000. This suggests that aromatherapy cajuput oil can reduce the frequency of nausea in the first trimester of pregnant women.	Can be self-interv medical especially hospitals. implemen easy, requ eucalyptu cotton.
2	The Effect Aromatherapy Cajuput Oil Concerning Emesis Gravidarum On Pregnant Women Trimester 1 in Independent Midwife's Clinic Ny F Ponorogo	Design : This research is survey research with a cross sectional approach. Population and sample: In this study, the population of all 1st trimester pregnant women who experienced nausea at the Ny F clinic in Ponorogo city in July 2015 as many as 17 pregnant women 1st trimester.	The researchers conducted a study of nausea levels before using aromatherapy cajuput oil, after being examined respondents taught how to use aromatherapy cajuput oil by taking 3 drops of oil cajuput oil drops on the tissues and breathing 5-10 minutes. Aromatherapy is used 3 times a day for 1 week, Conduct a live interview to the respondent to access the frequency of nausea, Compare the frequency of nausea before and after being given aromatherapy cajuput oil. Wilcoxon P-value value test results: 0.000 and alpha 0.005, meaning there is a significant	Can be self-interv medical especially hospitals. implemen easy, requ eucalyptu tissues.

			difference between nausea before and after aromatherapy is given.	

2.5.8 Eucalyptus Oil Aromatherapy Giving Procedures

Table 2.2 Eucalyptus Oil Aromatherapy Giving Procedures

Eucalyptus Oil Aromatherapy Procedure according to (Desi Diartami, 2021).

Definition	Eucalyptus oil aromatherapy is a eucalyptus distilled oil to reduce vomiting nausea in patients undergoing hemodialysis and includes non-pharmacological therapy.
Purpose	1. Reduces complaints of nausea. 2. Overcoming vomiting.
Tools and Materials	1. Eucalyptus oil aromatherapy. 2. Tissue.
Take action	1. Introduce yourself to the patient and explain the goals and actions to be taken. 2. Wash your hands and use a handscoon. 3. Set the patient's position as comfortable as possible. 4. Drip 3 drops of aromatherapy eucalyptus oil or on tissue. 5. Encourage patients to inhale eucalyptus oil aromatherapy for 10 minutes. 6. Observation for 30 minutes after aromatherapy. 7. Tidy up the tools. 8. Evaluate the patient's vomiting nausea after being given eucalyptus oil aromatherapy.