CHAPTER II
LITERATURE REVIEW

2.1 Basic Concepts of Osteoarthritis Genu

2.1.1 Definition

Osteoarthritis is a joint disorder characterized by degeneration of articular cartilage, thickening of the subchondral bone, and the formation of osteophytes around the edges of the joints.This condition is also accompanied by mild, nonspecific inflammation of the synovial tissue. Although it can affect various joints in the body, osteoarthritis most often occurs in weight-bearing joints, such as the knees and hips.(Rahmi, 2018).

Osteoarthritis of the knee joint is a disorder of the knee joint caused by damage to the articular cartilage, which triggers new bone formation on the joint surface. This condition can cause muscle and tendon weakness, limiting physical activity and reducing the quality of life and productivity of individuals and communities, especially among the elderly.(Andi, 2024).

2.1.2 Etiology

The exact etiology or cause of this degenerative joint disease is not yet fully understood, but several factors can potentially trigger the condition. These factors include (Engel, 2017):

a. Age

As a person ages, the risk of developing osteoarthritis of the knee increases. This occurs because the weight-bearing knee joint experiences

frequent friction and pressure, causing the cartilage lining the bones in the knee joint to gradually wear down and become more susceptible to degeneration.

b. Obesity

Being overweight contributes to an increased risk of developing osteoarthritis in the knee joint. Excessive body weight places additional stress on the joint's structures. As the mechanical stress the knee joint must withstand increases, the potential for bone tissue damage also increases.

c. Hereditary or congenital factors

Inherited factors such as the cartilage an individual has, the level of joint laxity, and irregularities in the joint surface also play a role in triggering osteoarthritis in the knee.

d. Trauma to the joints

Trauma, impact, or injury that occurs to the knee joint can cause damage to the bone structure and other components that form the joint, thereby disrupting its normal function.

e. Daily work and activities

Types of work and physical activities that involve repeated or excessive use of the knee joints are one of the factors that can trigger the onset of osteoarthritis in the knee.

f. Hormonal factors and metabolic diseases

The degenerative process in the knee joint can be influenced by hormonal changes that occur in postmenopausal women. Furthermore,

people with diabetes mellitus are also at higher risk of developing knee osteoarthritis.

2.1.3 Pathway

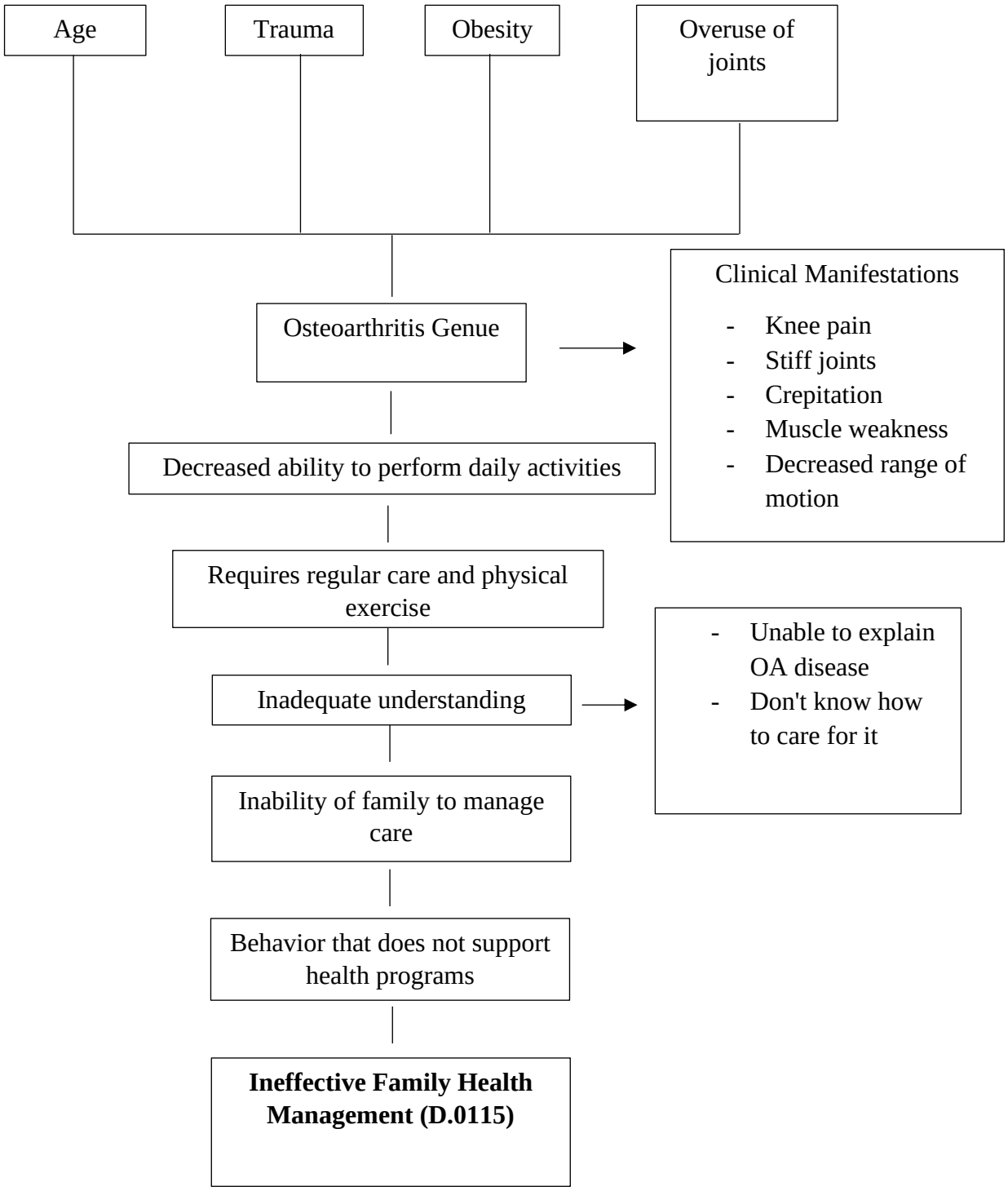


Figure 2.1Pathway

2.1.4 Clinical Manifestations

a. Knee Pain
   - It appears slowly and gets worse as the disease progresses
   - Increased with walking, prolonged standing, climbing stairs, or repetitive activities
   - Reduced with rest

b. Stiffness in the joints
   - Occurs after waking up or after a long period of inactivity
   - Usually lasts less than 30 minutes

c. Swelling of the knee joint
   - Can appear after excessive activity

d. Crepitation
   - There is a "crack-crack" sound or sensation when the joint is moved.

e. Joint instability
   - The knee feels wobbly or like it is giving way

f. Joint deformity
   - Bone enlargement (osteophytes)
   - Genu varum (O-shaped legs) or genu valgum (X-shaped legs) may occur in advanced cases.

g. Muscle weakness around the knee

h. Decreased functional ability
   - Difficulty walking long distances
   - Difficulty going up and down stairs

- Difficulty getting up from a sitting or squatting position or performing daily activities
- Decreased quality of life and independence

2.1.5 Management of Osteoarthritis of the Genu

A. Pharmacological

According to Wijaya (2018), pharmacological treatment for osteoarthritis focuses on pain reduction, which is crucial. Various types of analgesic drugs are used, including nonsteroidal anti-inflammatory drugs (NSAIDs), opiates, and other non-opiate analgesics. NSAIDs work by inhibiting the biosynthesis of prostaglandins formed during the inflammatory process, through inhibition of the cyclooxygenase (COX) enzyme. NSAID therapy is divided into nonspecific COX inhibitors and specific COX-II inhibitors. Examples of nonspecific COX inhibitors include ibuprofen, diclofenac, meloxicam, and aspirin, while celecoxib is an example of a selective COX-II inhibitor. In addition, a frequently used non-opiate analgesic is paracetamol (acetaminophen), which is effective in reducing pain in knee osteoarthritis, although its effectiveness is lower than NSAIDs, but it has fewer side effects.

B. Non-Pharmacological

According to (Nurudhin 2024) a non-pharmacological approach is the initial step in managing osteoarthritis (OA) and aims to reduce pain and improve joint function without the use of drugs, including:

a. A structured physical exercise program, such as aerobic exercise, muscle strengthening, and flexibility training, helps improve joint stability, reduces stiffness, and improves overall quality of life. It's important to tailor the exercise program to the individual's condition and abilities to minimize the risk of injury.
b. Weight loss is highly recommended for OA patients who are overweight. Being overweight or obese, especially those with OA in weight-bearing joints like the knees and hips. A 5-10% weight loss can significantly reduce pain and improve joint function. Consult a nutritionist to determine an appropriate diet for those with osteoarthritis (OA) to achieve healthy and balanced weight loss goals.
c. Using assistive devices such as canes, walkers, or orthoses can help reduce stress on affected joints and improve mobility. These devices help distribute the load evenly.

2.2 The Concept of Ineffective Family Health Management Problems

2.2.1 Definition

The pattern of handling health problems in the family is not satisfactory for restoring the health conditions of family members (SDKI DPP PPNI Working Group Team, 2016).

2.2.2 Major Data and Minor Data

1) Major Symptoms and Signs

a. Subjective

- Expressing not understanding the health problem suffered

- Expressing difficulty carrying out prescribed care

b. Objective

- Family member's illness symptoms are getting worse
- Family activities to address health problems are inappropriate

2) Minor Symptoms and Signs

a. Subjective

- (Not available)

b. Objective

- Failure to take action to reduce risk factors

2.2.3 Causative factor

1. The complexity of the health care system
2. Complexity of the care/treatment program
3. Decision-making conflict
4. Economic difficulties
5. Many demands
6. Family conflict

2.3 Strengthening Exercise

2.3.1 Definition

Strengthening exercises are physical exercises aimed at improving muscle strength, endurance, and function through repeated muscle contractions with or without resistance. These exercises help improve the muscles' ability to support joints, maintain stability, and support daily activities.

2.3.2 Advantages and disadvantages

1) Excess

1. Increase muscle strength, especially the quadriceps and hamstring muscles which play a role in knee joint stability.
2. Reduces joint pain and stiffness, thereby increasing comfort during activities.
3. Improve physical function and activities of daily living (ADL) ability.
4. Improve balance and reduce the risk of falls in the elderly.
5. Improving the quality of life and independence of osteoarthritis genu sufferers.
6. It is easy to do and can be carried out at home at a relatively low cost and can involve the family as companions.

2) Lack

1. Requires consistency and compliance in implementation to obtain optimal results.
2. Results are not obtained instantly, but require continuous practice over several weeks to months.
3. Potential to cause pain or injury if performed with improper technique, frequency, or intensity.
4. It needs to be adjusted to the condition and severity of osteoarthritis, so not all types of exercise are suitable for every patient.
5. Requires motivation and family support, especially for elderly people who experience physical limitations.

2.4 WOMAC Index

The Western Ontario and McMaster Universities Arthritis Index (WOMAC) is a measurement used to assess patients with lower extremity osteoarthritis. The WOMAC has been used for decades and is one of the most commonly used measures for knee and hip OA (Hanif, 2023).

The WOMAC is a questionnaire for assessing pain, stiffness, and function. Each subscale is rated on a 5-point ordinal scale: 0 (none), 1 (mild), 2 (moderate), 3 (severe), and 4 (very severe), with a maximum total score of 96 (Widyasari, 2021). A higher WOMAC score indicates a worse condition in terms of pain, stiffness, and function. Patients can complete the questionnaire themselves or undergo an interview, which must then be validated. Therefore, the WOMAC score can be used to evaluate the patient's severity (Thanaya et al., 2021).

2.5 Nursing Care Concept for Families with Osteoarthritis Genu Problems

2.5.1 Assessment

Assessment is the initial stage in the nursing process, systematically collecting data from various sources to assess and determine the client's health status. Data collection can be conducted through three methods: interviews, observation, and physical examination. Therefore, assessment is the first step that underpins the entire nursing process (Bolat & Teke, 2020).

The assessment data obtained from the client is as follows:

1) Identity

This includes full name, place and date of birth, religion, language spoken, ethnicity, address, and age. Client identification data that can be assessed for patients with genu osteoarthritis include age and gender, as this condition is more common in female clients and those over 60. Additionally, a history of knee injuries and previous joint disease should be assessed.

2) Health History

a. Basic family data, data that needs to be studied include: family name, address and telephone number, family composition, family type, cultural background (ethnicity), religious identification, family class status, recreational activities and family free time.

b. Family environmental data, data that needs to be studied include: characteristics of the home, characteristics and the surrounding environment and the larger community, geographic mobility of the family, family associations and interactions with the community, and family support systems.

c. The family structure consists of:

1. Family communication patterns: the data that must be studied are observations of all family members in their relationships with each other, whether communication within the family is functioning or not, how well each family member is a listener, clear in delivery, feelings towards communication and interaction, whether the family involves emotions or not in delivering messages.

2. Family power structure: what needs to be studied include: who makes decisions in the family, who makes important decisions.
3. Family budget, changing jobs, residence, managing children's discipline and activities and the process of decision making with concerisus bargaining and so on.
4. Family role structure: data that can be studied in formal roles are the formal roles and positions of each family member, there is no conflict in the role, how they feel about their role. If necessary, can the role be flexible. If there is a problem in the role, who influences family members, who gives them assessments about growth, new experiences, roles and communication techniques.
5. Informal roles: informal roles and unclear roles exist within the family. How do family members carry out their roles? Are their family positions aligned with the roles they carry out? If roles are not carried out, ask who usually carried out the role before and what the impact was.
6. Values and culture, the data that can be studied are the dominant values adopted by the family, family values such as who plays a role in earning a living, the will and control of the environment, future orientation, family hobbies, whether there is a match between family values and the wider community, whether there is a match between family values and the values of the family subsystem, how important are values to the family, whether the family adheres to family values consciously or not,

whether there is a prominent value conflict in the family itself, how values affect family health.

d. Family functions

1. A family's affective function can be assessed through patterns of emotional needs fulfillment and responses among family members, particularly when a family member experiences osteoarthritis of the genu (OA genu). The assessment includes how family members perceive the presence and condition of the affected member, the ability of the spouse or other family members to understand pain, activity limitations, and care needs. Furthermore, the family's level of sensitivity to changes in the feelings and needs of the person with OA genu, such as difficulty walking, climbing stairs, or performing daily activities, is also assessed. Mutual trust, attention, and emotional support from the family can help the person feel valued and less burdened by their condition. Good relationships between family members also play a role in increasing the person's motivation to undergo recommended treatment and physical exercise.
2. Regarding social function, data that needs to be assessed includes how roles and responsibilities are divided among family members. The assessment includes how the family regulates behavior, implements discipline, provides rewards and consequences, encourages independence, and provides assistance as needed for family members with OA genu. Furthermore, it is necessary to assess the roles of those

who provide care, assist with daily activities, accompany treatment, and meet the patient's needs. The assessment also includes the family's ability to provide support, affection, and create harmonious relationships so that family members with OA genu feel cared for and receive optimal support in undergoing treatment and daily activities.

3. The socialization function of families with members with OA genu can be assessed through the division of tasks and responsibilities within the family, including meeting the needs and providing care for the sick member. The assessment includes the family's ability to adapt to the patient's physical limitations, the forms of support and attention provided, and the cultural values that influence the implementation of family roles. Furthermore, it is necessary to assess the possibility of obstacles to family functioning due to OA genu, as well as the extent to which environmental support assists the family in caring for the patient and carrying out daily activities.
4. Reproductive function, data that needs to be studied, how many children, how the family plans the number of children, what methods the family uses to control the number of children.
5. The function of health care in carrying out the five family health tasks, things that need to be studied include:
    a) The family's ability to recognize health problems, data that needs to be studied, family knowledge about the health problem of genu

osteoarthritis which includes causative factors, signs and symptoms and family perceptions of the problem.

b) The family's ability to make decisions regarding appropriate actions to address OA genu. Aspects that need to be assessed include the family's level of knowledge regarding the definition, causes, signs and symptoms, and impact of OA genu on the health of family members. Furthermore, it is important to determine whether the family is aware of the health problem they are experiencing, their attitude toward the condition, whether the family displays a resigned attitude or seeks solutions, and their understanding of the potential consequences if the problem is not handled properly.

c) Family's ability to care for a sick family member. To determine the family's ability to care for a family member suffering from OA genu, it is necessary to assess the extent of the family's knowledge regarding the condition of the disease experienced, including the causes, signs and symptoms, and development of the disease. In addition, the family's understanding of the necessary care needs, facilities or means that can be used to support care, and available health care resources is assessed. The assessment also includes the family's attitude towards the sick family member and family involvement in supporting the care and recovery process of the OA genu sufferer.

d) A family's ability to maintain a healthy home environment can be assessed through their knowledge of the resources they have to maintain a healthy environment. The assessment includes the family's understanding of the benefits of maintaining a healthy environment, the importance of hygiene and sanitation, and disease prevention efforts. Furthermore, it is necessary to assess the family's attitudes and perspectives on hygiene and sanitation practices, as well as the level of cooperation and solidarity among family members in creating and maintaining a healthy home environment, particularly for family members with genital OA.

e) A family's ability to utilize health care facilities can be assessed through their level of knowledge regarding the availability and access to them. This assessment includes the family's understanding of the benefits of using health care facilities, their level of trust in health care workers and the services they provide, their experience accessing health care services, and the accessibility of available health care facilities.

e. Family Stress and Coping

The family stress and coping assessment includes identifying short-term and long-term stressors faced by the family. Furthermore, the family's ability to face and resolve problems, the coping strategies used, and the presence of ineffective or dysfunctional adaptation mechanisms are assessed. A

systematic head-to-toe physical examination is performed to assess the health of family members, particularly those with OA genu.

2.5.2 Family Nursing Diagnosis

The nursing diagnosis that appears in patients with osteoarthritis genu according to (SDKI DPP PPNI Working Group Team, 2016) is Ineffective Family Health Management related to the complexity of the treatment program characterized by expressing not understanding the health problems suffered, family activities to overcome health problems are inappropriate (D.0115).

- Physiological Data

  In families with ineffective family health management, nurses must review the data on major and minor signs and symptoms listed in the Republic of Indonesia Nursing Diagnosis Standards (SDKI) book, including:

  1) Major Symptoms and Signs

     Subjective:

     - Expressing not understanding the health problem suffered
     - Expressing difficulty carrying out prescribed care

     Objective

     - Family member's illness symptoms are getting worse
     - Family activities to address health problems are inappropriate

  2) Minor symptoms and signs

     Subjective

     - (Not available)

Objective

- Failure to take action to reduce risk factors

2.5.3 Nursing Interventions

Table 2.1Nursing Care Plan

Nursing Problems	Objectives/Result Criteria	Intervention
Ineffective Family Health Management (D.0115)	After nursing actions are carried out, family health management is expected (L.12105) increased Result criteria: 1. The ability to explain health problems experienced increases 2. Family activities to address health problems appropriately increase 3. Actions to reduce risk factors increase 4. Verbalization of difficulty performing prescribed care decreased 5. Symptoms of family member's illness are hereditary	**Family Support Planning Care (1,3477)** **Observation** 1. Identify family needs and expectations regarding health 2. Identify the consequences of not taking action with the family 3. Identify the resources the family has 4. Identify actions that families can take **Therapeutic** 5. Motivation to develop attitudes and emotions that support health efforts 6. Use the means and facilities available in the family 7. Create optimal changes to the home environment **Education**

Nursing Problems	Objectives/Result Criteria	Intervention
		8. Provide information about health facilities in the family environment 9. Recommend using existing health facilities 10. Teach care methods that families can do

2.5.4 Nursing Implementation

Nursing implementation is the stage when nurses carry out plans or interventions previously developed based on SIKI terminology. This stage includes the implementation of actions and documentation of specific actions used to realize the planned interventions (SDKI DPP PPNI Working Group Team, 2016).

The actions taken can be carried out according to or not according to the sequence determined at the planning stage, depending on the patient's condition and needs at the time of implementation (Debora, 2013).

One nursing intervention to address osteoarthritis is strengthening exercises. Strengthening exercises aim to increase muscle strength around the knee joint, particularly the quadriceps and hamstrings, thereby improving joint stability, reducing pain, maintaining range of motion, and increasing the patient's functional ability and independence in performing daily activities (Borasseau et al., 2017).

Strengthening exercise implementation stage

1. Knee Extension
    - Sit up straight on a chair
    - Straighten one leg forward then lift it slowly
    - Hold for 5 – 10 seconds
    - Lower slowly to the original position
    - Repeat 10 – 15 times

    Benefits for strengthening the quadriceps muscles
2. Long Arc Quad Exercise
    - Sit on a chair with both feet on the floor
    - Slowly lift and straighten your knees
    - Knee flexion and extension movements
    - Repeat 10 – 15 times

    Benefits for increasing quadriceps muscle strength and knee stability
3. Seated Marching
    - Sit up straight on a chair
    - Lift the right knee as if walking in place
    - Lower, then do it on the left knee
    - Do it alternately 10 – 15 times

    Benefits for strengthening thigh and pelvic muscles
4. Heel Raise Sitting Position
    - Sit with both feet on the floor
    - Raise your heels until they rest on the tips of your toes
    - Hold for 3 – 5 seconds

- Lower slowly
- Repeat 10 – 15 times

Benefits for strengthening calf muscles and helping balance

5. Hip Adduction with Pillow
    - Place a small pillow between your knees
    - Pinch the pillow with both knees
    - Hold for 5 – 10 seconds
    - Release slowly
    - Repeat 10 – 15 times

    Benefits for strengthening the inner thigh muscles and increasing leg stability.
6. Cooling stage
    - Move your knees slowly
    - Do some light stretching
    - Rest 3 – 5 minutes
    - Evaluate for pain, fatigue, or discomfort after exercise.

2.5.5 Nursing Evaluation

Nursing evaluation is the final action in the nursing care process. Evaluation can include structural, process, and outcome evaluations (Tarwoto, 2015). Nursing care evaluations are documented in the form of a SOAP (Sumadi Kaize & Dwi Ningsih, 2022):

1. S (subjective), when the nurse encounters a patient's complaint which is still felt even though nursing actions have been carried out.
2. O (objective), data obtained from observations based on the results of evaluations of actions that have been carried out, measurements carried out by nurses are based on direct observation of patients and what patients feel after the treatment is carried out.
3. A (assessment), namely subjective and objective data to assess the extent to which goals have been achieved
4. P (Plan), which is an action plan based on analysis, if the goal is achieved, the nurse stops the plan, if the goal is not achieved, the nurse changes the plan and continues the patient care plan. This evaluation is usually called an evaluation.

a. Evaluation of family health management is ineffective

Aspects that can be evaluated regarding the family's ability to manage health in the case of genu osteoarthritis are as follows:

1) The ability to explain health problems experienced increases
2) Family activities to address health problems increase
3) Actions to reduce risk factors increase
4) Verbalization of difficulty carrying out the applied treatment decreased
5) Symptoms of osteoarthritis of the genu are hereditary in family members.

b. Strengthening Exercise Evaluation

Using the WOMAC questionnaire, this questionnaire can evaluate 3 subscales, namely pain (5 items), stiffness (2 items) & function (17 items) which are scored on a 5-point ordinal scale, namely 0 "none", 1 "mild", 2 "moderate" 3 "severe" and 4 "very severe". The range of pain subscale values (0-20), stiffness (0-8) and function (0-68). The total score is obtained by adding the scores of the 3 subscales, with a maximum score of 96. A higher WOMAC score indicates worse pain, stiffness and functional limitation. The total WOMAC score can be categorized into 3 groups, namely low risk (score ≤ 60), moderate risk (score 60-80) and high risk (score ≥ 81).

2.6 Family Concept

2.6.1 Definition

According to Friedman (2010) in Mareta (2023), a family is a group of two or more people who live together and share a close emotional bond. Relationships between members are not always based on blood ties, marriage, or adoption, and membership is not restricted by specific rules. A family is a group of individuals living in one household and having ties formed through marriage, blood relations, or adoption (Kesuma et al., 2023).

2.6.2 Family Duties in the Health Sector

Family roles are a series of behaviors and responsibilities expected of family members in various situations. These roles include recognizing health problems, making appropriate health-related decisions, providing care to sick family members, creating a healthy family environment, andSupporting family

members in obtaining health services. In efforts to prevent and address health problems, especially in the elderly, carrying out family duties and responsibilities in the health sector is crucial.

Families are expected to be able to recognize the signs and symptoms of illness and how to prevent them in their members. Health information should be obtained from official and trusted sources. Furthermore, families need to implement preventive measures in accordance with the recommendations of the WHO and the Indonesian Ministry of Health.

(February et al., 2019).

2.6.3 The Role of Family Nurses

The role of the family nurse is a set of functions and responsibilities performed by nurses in providing nursing care to individuals, families, and communities to help improve, maintain, and restore the family's health status. Nurses act as caregivers, educators, counselors, coordinators, collaborators, advocates, and facilitators in efforts to solve family health problems (Ramadia et al., 2023).