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# Characteristics of Osteoarthritis Genu Patients at Ibnu Sina Hospital Makassar Based on Clinical Manifestations, Body Mass Index, and Radiological Imaging

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**Abstract**

**Background:** Knee osteoarthritis is a major cause of chronic pain and disability in the elderly. Obesity is a key risk factor, as excess body weight increases pressure on knee joints. Clinical and radiological assessments are essential to determine disease severity. **Objective:** To describe the characteristics of knee osteoarthritis patients at Ibnu Sina Hospital Makassar during 2023–2024 based on clinical manifestations, body mass index (BMI), and radiological imaging. **Methods:** A descriptive cross-sectional study was conducted using medical records of 63 patients with knee osteoarthritis. Variables analyzed included clinical manifestations, BMI, and radiological grading. **Results:** Of 63 patients, most (50.8%) presented with bilateral knee pain as the main complaint, while 25.4% experienced knee swelling. BMI analysis showed that the largest proportion of patients were in obesity class I (30.2%). Radiological imaging revealed that 41.3% were classified as grade II according to the Kellgren and Lawrence criteria. **Conclusion:** Knee osteoarthritis patients at Ibnu Sina Hospital Makassar were predominantly characterized by bilateral knee pain, obesity class I, and grade II radiological severity. Interventions such as weight management, physiotherapy, and public education on joint health are important to reduce risk and slow disease progression.

**Keywords:** *Knee Osteoarthritis, BMI, Radiological Imaging, Clinical Manifestations, Obesity*

## Introduction

Osteoarthritis (OA) is one of the most common chronic joint diseases worldwide. This disease is often non-inflammatory and a major cause of physical disability, particularly in the elderly population. Among the various joints that can be affected, the knee is the most frequently affected by OA. Knee osteoarthritis occurs due to progressive damage to the articular cartilage, followed by the formation of new bone on the joint surface. This condition can lead to weakening of muscles and tendons around the knee, thereby limiting mobility. Consequently, an individual's quality of life declines, and work productivity at both individual and societal levels is impacted[1–4]. Globally, OA affects approximately 240 million people. Its prevalence reaches 9.6% in men and 18% in women over 60 years of age. In Indonesia, OA prevalence is recorded at 8.1% of the total population, with about 80% of patients experiencing mobility limitations, and 20% unable to perform daily activities. Based on data from the Basic Health Research (RISKESDAS) in 2018, OA prevalence in South Sulawesi Province was 6.39%, while in Makassar City it reached 6.04%[1–4]. Osteoarthritis is classified into two types: primary OA and secondary OA. Primary (idiopathic) OA has no clear cause and is not

associated with systemic diseases, inflammation, or local joint changes. Conversely, secondary OA is related to factors such as excessive joint use, injury, systemic diseases, or inflammation. Between these two types, primary OA is more commonly found [1,5]. Major risk factors for primary OA include age, gender, race, genetic factors, obesity, metabolic diseases, joint injuries, physical activity, muscle strength, growth abnormalities, and knee alignment. Other factors such as high bone density are also associated with increased OA risk, as denser bones tend to increase load on articular cartilage, thereby triggering further damage [6].

Lack of physical activity accompanied by excess body weight can increase pressure on joints, especially weight-bearing joints like the knee. This condition is exacerbated by hormonal changes in the elderly that accelerate degeneration of joint structures. Functional impairment due to OA can be very burdensome, where sufferers experience difficulties in daily activities such as rising from sitting, squatting, standing, walking, climbing stairs, and other activities that load the knee [7].

Body Mass Index (BMI) is a practical method to assess a person's nutritional status. BMI is calculated by dividing weight (in kilograms) by the square of height (in meters). Based on this calculation, a person's nutritional status can be categorized as underweight, normal, overweight, or obesity. Obesity increases the risk of OA, especially in weight-bearing joints, because it adds load to those joints. Weight loss can help reduce OA pain. A person with a BMI over 22 has a much higher risk (up to 2000 times) of developing OA compared to individuals with normal BMI [8–10]. Radiological examination using X-ray can show typical OA images, such as joint space narrowing, increased subchondral bone density, osteophyte formation, and anatomical joint changes. The severity of OA according to the Kellgren and Lawrence scale is divided into five levels, based on the presence of osteophytes, joint space narrowing, and bone sclerosis. Research shows a significant relationship between increased BMI and OA severity seen through radiography [8,9].

Based on this background, this study aims to evaluate the characteristics of knee OA patients at Ibnu Sina Hospital Makassar based on clinical manifestations, BMI, and radiological findings. This research is expected to contribute to a deeper understanding of factors influencing knee OA and their implications for clinical patient management. The Research Question is: What are the clinical characteristics of knee OA patients at Ibnu Sina Hospital Makassar?.

## Materials and Methods

### *Study Design*

This research is a descriptive study with a cross-sectional design. The study was conducted to determine the characteristics of knee osteoarthritis patients at Ibnu Sina Hospital Makassar during the period January 2023 to October 2024 based on clinical manifestations, body mass index (BMI), and radiological findings.

### *Sample*

The population in this study was all knee osteoarthritis patients who had anamnesis results, BMI, and radiological findings at Ibnu Sina Hospital Makassar during the research period. Sample selection was done using total sampling technique, where all patients meeting the inclusion criteria were included in the study. Inclusion criteria included patients who had complete data regarding clinical manifestations, BMI, and radiological findings.

### *Data Collection Techniques*

Data collection was conducted after obtaining permission from Ibnu Sina Hospital Makassar. Data were taken from medical records of knee osteoarthritis patients, which included

information on: Clinical manifestations recorded in anamnesis; Body Mass Index (BMI) calculated from weight and height data; Radiological findings based on patient X-ray examination results. Data were then recorded into a provided table to facilitate analysis.

***Data Analysis Techniques***

Collected data were analyzed using statistical software. Analysis was performed to describe patient characteristics based on clinical manifestations, BMI, and radiological findings. Analysis results were presented in tables and diagrams to facilitate interpretation.

***Ethical Consideration***

This research was conducted after obtaining ethical approval from the Research Ethics Committee of Universitas Muslim Indonesia with approval number 397/A.1/KEP-UMI/VIII/2024 on August 15, 2024. Researchers ensured patient data confidentiality and only used data for research purposes. Every patient whose data was used had provided written informed consent.

**Result**

This study aims to analyze the characteristics of knee osteoarthritis patients at Ibnu Sina Hospital Makassar based on clinical manifestations, body mass index (BMI), and radiological findings. Data used were secondary data from patient medical records with collection period from January 2023 to October 2024. A total of 63 medical records meeting inclusion and exclusion criteria were analyzed in this study. Analysis results are presented in tables describing patient characteristics based on chief complaint, accompanying complaints, BMI, and radiological findings. Below is a detailed presentation of the research results.

Table 1 shows that the majority of knee osteoarthritis patients had bilateral knee pain as the chief complaint (50.8%). Pain in the left knee was reported by 28.6% of patients, while pain in the right knee was reported by 19.0% of patients. Only 1.6% of patients complained of burning and stabbing pain in the knee. This indicates that bilateral knee pain is the most common complaint among knee osteoarthritis patients.

Knee swelling was the most frequently reported accompanying complaint, reported by 25.4% of patients. Other fairly common complaints included increased knee pain during activity (15.9%), morning stiffness (12.7%), and altered walking gait (12.7%). Some patients also reported other symptoms such as crepitus (11.1%), weakness (6.3%), joint movement restriction (6.3%), lower back pain (4.8%), tenderness (3.2%), and stabbing sensation in the foot (1.6%). This variation in accompanying complaints reflects the complexity of the condition experienced by knee osteoarthritis patients.

Based on BMI classification, the largest proportion of patients fell into Obesity Class I (30.2%). A total of 22.2% of patients had normal BMI, while patients with Obesity Class II were also quite high at 22.2%. Overweight patients reached 14.3%, while underweight patients numbered 7 (11.1%). These results show that obesity, particularly Class I and II, is a common factor among knee osteoarthritis patients at this hospital.

On radiological examination, the majority of patients showed Grade II (41.3%) and Grade III (39.7%) radiological findings, indicating moderate to severe severity of knee osteoarthritis. A total of 11.1% of patients were in Grade I, reflecting mild severity, while only 7.9% of patients were in Grade IV, reflecting the highest severity level. This data indicates that most patients experienced significant knee joint damage, both clinically and radiologically.

This data shows that the majority of knee osteoarthritis patients at Ibnu Sina Hospital Makassar complained of bilateral knee pain, often accompanied by knee swelling. Obesity is

a common risk factor among osteoarthritis patients, and radiological results show joint damage at moderate to severe levels. This highlights the importance of holistic medical interventions, including pain management, weight management, and regular radiological monitoring.

**Table 1.** Characteristics of Osteoarthritis Genu Patients Based on Main Complaint, Accompanying Symptoms, Body Mass Index (BMI), and Radiological Findings (January 2023–October 2024)

| Category | Subcategory | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **Main Complaint** | | | |
| | Pain in both knees | 32 | 50.8 |
| | Pain in right knee | 12 | 19.0 |
| | Pain in left knee | 18 | 28.6 |
| | Burning and stabbing pain in the knee | 1 | 1.6 |
| **Accompanying Symptoms** | | | |
| | Knee swelling | 16 | 25.4 |
| | Joint movement restriction | 4 | 6.3 |
| | Morning stiffness | 8 | 12.7 |
| | Crepitus | 7 | 11.1 |
| | Weakness | 4 | 6.3 |
| | Increased knee pain during activity | 10 | 15.9 |
| | Lower back pain | 3 | 4.8 |
| | Tenderness | 2 | 3.2 |
| | Altered walking gait | 8 | 12.7 |
| | Stabbing sensation in the foot | 1 | 1.6 |
| **BMI Classification** | | | |
| | Underweight | 7 | 11.1 |
| | Normal | 14 | 22.2 |
| | Overweight | 9 | 14.3 |
| | Obesity I | 19 | 30.2 |
| | Obesity II | 14 | 22.2 |
| **Radiological Findings** | | | |
| | Grade I | 7 | 11.1 |
| | Grade II | 26 | 41.3 |
| | Grade III | 25 | 39.7 |
| | Grade IV | 5 | 7.9 |
| **Total** | | **63** | **100** |

## Discussion

### *Clinical Manifestations of Knee Osteoarthritis Patients*

Based on research results obtained at Ibnu Sina Hospital Makassar Period January 2023-October 2024, the most common chief complaint among patients suffering from knee osteoarthritis was pain in both knees, with 32 people (50.8%). This research result aligns with a study conducted by Permatasari[11] which found that all 27 respondents (100%) reported knee pain as the chief complaint. Additional clinical findings complained of by knee osteoarthritis patients was joint swelling, experienced by 16 people (25.4%). This finding is also consistent with research by Regi Sonjaya[12], which mentioned that 49 people (24.62%) experienced knee pain accompanied by edema [11,12].

Pain is the chief complaint in knee osteoarthritis patients, which typically worsens with movement and slightly decreases with rest. This pain is caused by inflammation in the joint (synovitis), joint effusion, and bone marrow swelling, which occurs due to excessive load on the knee joint, accelerating cartilage damage, especially in individuals with obesity. Initially, pain is often felt in only one

knee, but can develop bilaterally over time due to abnormal load on the healthy knee caused by changes in walking patterns. Swelling also occurs due to the inability of chondrocytes to produce matrix, leading to inflammation of the synovial membrane. This condition is marked by gradually increasing knee pain over several months or even years, so that in the final stage patients feel pain even at rest. Symptoms that develop slowly include pain, morning stiffness, limited movement, and changes in walking patterns, due to thinning of the synovium causing articular cartilage and subchondral bone to touch each other. Sources of pain come from stimulation of mechanoreceptors and nerve endings in the synovium and surrounding tissues, and can also be referred pain or sympathetic efferent pain [11–16].

### *Body Mass Index of Knee Osteoarthritis Patients*

Based on research results obtained at Ibnu Sina Hospital Makassar Period January 2023-October 2024, the most common BMI among patients suffering from knee osteoarthritis was Obesity I with 19 people (30.2%). This result aligns with research conducted by Ambarwati[17] which stated that the body mass index of knee osteoarthritis patients was most commonly in the obesity I category with 47 people (53.4%)[17].

Obesity is a condition where there is excessive fat accumulation making a person's body weight far above normal limits. This condition causes an imbalance between energy intake and expenditure, leading to increased pressure on the knee joint, especially during movement. During activity, body weight exerts pressure on the knee joint, with a load of about 3-6 times body weight, especially when walking, running, or exercising. In normal weight conditions, body weight passes through the medial side of the knee joint and is balanced by the work of muscles on the lateral side, whereas in obesity, body weight distribution shifts medially, resulting in unbalanced load and triggering cartilage erosion in that joint.

The knee joint functions as a body balancer, so the presence of surrounding muscles is very important. In individuals with obesity, increased fat mass within muscles can result in weakness when walking or standing. The increasing load on the knee joint surrounded by weak muscles will reduce the muscles' ability to withstand pressure, which can eventually cause trauma to the cartilage. If this load and trauma persist, sufferers will feel increasingly severe pain and difficulty walking. This condition can trigger reduced physical activity, leading to muscle atrophy and further worsening knee joint weakness. Physical activity that is still possible in obesity degree 1 often worsens the patient's condition compared to patients with more severe obesity whose activity is more limited. The initial process of joint damage will lead to the formation of abnormal cartilage and activate an inflammatory cascade that enzymatically damages the knee joint. Obesity can increase production of pro-inflammatory cytokines such as IL-6, IL-8, and TNF-α produced by adipose tissue [8,18,19].

### *Radiological Findings of Knee Osteoarthritis Patients*

Based on research results obtained at Ibnu Sina Hospital Makassar Period January 2023-October 2024, the majority of respondents had Radiological Findings Criteria Grade II, namely 26 people (41.3%). This result aligns with research by al Fira Hartono[20] which stated that the majority of respondents experienced grade II knee osteoarthritis, namely 125 respondents (71.0%) out of a total of 176 respondents. Another similar study was conducted by Nafi'ah S[21] which stated that the highest proportion of severity distribution was in patients with conventional radiography results grade II, namely 20 patients (16.1%). The results of this study differ from research

conducted by Permatasari[11] which stated that the highest proportion was in knee osteoarthritis patients with Kellgren and Lawrence scores grade III and grade IV, each with 9 respondents (33.3%). Conventional radiography results are highly influenced by the level of severity or damage to the joint. This joint damage can occur due to increased load that the joint must bear [11,20,21].

Kellgren and Lawrence assessment is a method often used to assess the severity of knee osteoarthritis based on radiographic images. Grade II depicts the presence of osteophytes and possible joint space narrowing. The most common method used to assess osteoarthritis severity is Kellgren and Lawrence. Kellgren and Lawrence classification can also help healthcare providers with treatment algorithms to guide clinical decision-making, particularly determining which patients are most likely to benefit from surgical management [20,21].

## Conclusion

Based on the research results, the majority of knee osteoarthritis sufferers at Ibnu Sina Hospital Makassar complained of bilateral knee pain as the chief complaint, with knee swelling being the most frequently reported accompanying complaint. Most patients also experienced Class I obesity, which is a significant risk factor in the development of this disease. From radiological examination, the majority of patients showed grade II knee osteoarthritis based on Kellgren and Lawrence criteria, reflecting moderate severity of knee osteoarthritis.

As a recommendation, it is important to enhance public education about the importance of maintaining ideal body weight and engaging in appropriate physical activity to reduce the risk of knee osteoarthritis, especially in individuals at risk of obesity. Hospitals are also advised to expand physiotherapy services for osteoarthritis patients, to help reduce pain complaints and improve patients' quality of life through targeted physical exercise. Regular monitoring is also crucial, especially for patients with obesity and radiological findings of grade II or higher, to monitor disease progression and response to treatment. Future research is expected to explore the relationship between regular physical activity and reduction of osteoarthritis symptoms in obese patients, as well as to evaluate the effectiveness of medical rehabilitation methods in slowing disease progression.

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