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Functional Profile of Patients with Knee Osteoarthritis at the Physical Medicine and Rehabilitation Clinic of Sanjiwani General Hospital Gianyar

Dewa Ngakan Putu Yogi Astika, Cendy Damayanti, I Nengah Bagus Surianta
Department of Physical Medicine and Rehabilitation, Sanjiwani General Hospital Gianyar, Indonesia
astika.yogi@yahoo.com

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Abstract
Introduction: *Osteoarthritis (OA) is the most common form of arthritis worldwide, affecting millions and representing a leading cause of disability, particularly among the elderly. In Indonesia, the number of OA cases has more than doubled from 1990 to 2019. However, data on osteoarthritis cases in Bali remain limited. OA is a major cause of joint pain, swelling, and stiffness, leading to decreased quality of life.* ***Objective:*** *This study aims to explore the clinical profile and functional status of patients with knee osteoarthritis to provide a foundational database for future management.* ***Methods:*** *This was a descriptive observational study using a cross-sectional design. Data were collected during a single visit of patients diagnosed with knee OA to the Physical Medicine and Rehabilitation Outpatient Clinic at Sanjiwani General Hospital, Gianyar. Functional status was assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire.* ***Results and Discussion:*** *Most of subjects were aged ≥61 years and predominantly female. Body Mass Index (BMI) ranged from normal to overweight. Most patients worked in the private sector. The WOMAC scores mostly fell within the mild category.* ***Conclusion:*** *The study found that patients with knee OA generally exhibited mild functional impairment, with minimal disruption to daily activities.*

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Introduction

Osteoarthritis (OA) is the most prevalent form of arthritis worldwide, affecting millions of individuals and constituting a leading cause of disability, particularly among older adults. This degenerative joint disorder primarily affects the knees, hips, and hands, presenting with symptoms such as joint pain, stiffness, and reduced mobility, all of which significantly compromise physical function and overall quality of life. Pathophysiologically, OA is characterized by the progressive degradation of articular cartilage and subchondral bone, ultimately resulting in joint pain, deformity, and loss of function. According to the World Health Organization, approximately 10% to 15% of individuals aged 60 years and older are affected by OA to varying degrees of severity (Zhao et al., 2024).

In Indonesia, the number of OA cases more than doubled between 1990 and 2019. The incidence of OA—particularly knee OA—was notably higher in 2019 compared to 1990, with knee OA exhibiting a slightly greater rate of increase. Age-adjusted incidence and prevalence rates indicate that OA is more common in females than in males, pointing to contributing factors beyond simple mechanical degeneration. These may include inflammatory mechanisms and anatomical differences, such as smaller knee joint dimensions in women. Globally, the burden of OA continues to rise, with Indonesia experiencing a faster increase in prevalence than several neighboring countries, including China, Singapore, and India. Although OA accounts for fewer Years Lived with Disability (YLDs) than conditions such as low back pain, stroke, diabetes, and chronic obstructive pulmonary disease (COPD), its rate of YLD increase surpasses that of these major diseases (Butarbutar et al., 2024).

Data on OA cases in Bali remain limited. A study conducted at Sanglah Central General Hospital Denpasar between January 2014 and December 2016 examined the clinical profile of OA patients and found that among the three primary types of OA, knee osteoarthritis was the most prevalent. The condition predominantly affected individuals over the age of 60, with a higher incidence in females. Most patients had a normal Body Mass Index (BMI) ranging from 18.5 to 25.0, a history of joint trauma, and no history of smoking. The study identified a history of trauma as the strongest risk factor for OA in this population (Putra et al., 2019).

OA is a leading cause of joint pain, swelling, and stiffness, all of which substantially diminish an individual's quality of life. Although OA can affect any joint, the knee is most commonly involved due to its critical weight-bearing role. In 2020, the global prevalence of knee OA was reported to reach approximately 16% (Butarbutar et al., 2024).

OA is a chronic musculoskeletal disorder that affects the joints and surrounding tissues, resulting in progressive degeneration of the articular cartilage, subchondral bone, and synovial structures. The incidence and prevalence of OA continue to rise globally, establishing it as one of the most common orthopaedic conditions and a substantial burden on both patients and healthcare systems (Giorgino et al., 2023).

Although OA can affect multiple joints, the greatest social and economic burden arises from hip and knee osteoarthritis, as both are major contributors to progressive disability and frequently necessitate joint replacement surgery. Globally, an estimated 300 million individuals are affected by hip and knee OA. According to the 2010 Global Burden of Disease report, OA of the hip and knee ranks among the leading causes of disability worldwide, as measured by YLDs and Disability-Adjusted Life Years (DALYs) (Giorgino et al., 2023).

Understanding the pathophysiology of OA remains a significant challenge due to its multifactorial nature, limited accessibility to affected joint tissues, and the heterogeneity of clinical phenotypes. Recent studies have elucidated several key mechanisms contributing to OA progression, including articular cartilage degradation, subchondral bone remodeling, ectopic bone formation and osteophyte development, joint capsule hypertrophy, and synovial inflammation. Notably, chronic low-grade inflammation is now recognized as a central driver in OA pathogenesis. Additionally, chronic OA-related pain has been increasingly associated with central sensitization—an enhanced responsiveness to pain stimuli mediated by the central nervous system. While the therapeutic implications of this evolving understanding of OA are beyond the scope of this review, this more nuanced pathophysiological framework has important therapeutic implications and provides a foundation for interventions targeting diverse pathogenic pathways (Coaccioli et al., 2022).

Despite its high prevalence, the diagnosis of OA can be challenging. Specific diagnostic criteria have been established to distinguish knee OA from other arthritic conditions such as rheumatoid arthritis and ankylosing spondylitis. The American College of Rheumatology (ACR) classification criteria are among the most widely used. The clinical diagnostic criteria include knee pain accompanied by at least three of the following: age over 50 years, morning stiffness lasting less than 30 minutes, crepitus, bony tenderness, bony enlargement, and absence of warmth upon palpation. Laboratory findings supportive of OA include an erythrocyte sedimentation rate (ESR) below 40 mm/h, a rheumatoid factor (RF) titer less than 1:40, and synovial fluid findings consistent with non-inflammatory arthritis. Radiographic criteria include the presence of knee pain with osteophyte formation, in combination with at least one of the following: age over 50 years, morning stiffness under 30 minutes, or crepitus (Hellmi et al., 2021).

Magnetic resonance imaging (MRI) and arthroscopic studies have further demonstrated that crepitus is particularly associated with patellofemoral joint OA. An additional arthroscopy-based study found that crepitus correlates with cartilage pathology in both medial and lateral compartments of the knee. Structural changes such as cartilage degeneration and skeletal remodeling can be assessed radiographically and quantified using established semi-quantitative grading systems, including the Kellgren–Lawrence (KL) scale, the Ahlbäck classification, and the Knee Osteoarthritis Grading System (KOGS) (Jang et al., 2021).

In Indonesia, healthcare professionals are involved in managing patients across all stages of knee OA, highlighting the importance of utilizing standardized outcome measures to evaluate care quality and inform clinical decision-making. Several validated instruments are available for assessing functional outcomes in patients with knee OA. Among the most widely used are the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the Knee Injury and Osteoarthritis Outcome Score (KOOS), the Ibadan Knee Osteoarthritis Outcome Measure (IKHOAM), and the Community Balance and Mobility Scale (CBM) (Thanaya et al., 2021).

The WOMAC, developed by Bellamy et al. in 1982, is one of the most extensively used instruments for evaluating symptoms and functional status in patients with knee osteoarthritis. The WOMAC assesses three dimensions: pain (5 items), stiffness (2 items), and physical function (17 items). Each item is rated on a 5-point ordinal scale ranging from 0 (“none”) to 4 (“extreme”). The possible score ranges for each subscale are: pain (0–20), stiffness (0–8), and function (0–68), yielding a total composite score ranging from

0 to 96. Higher scores reflect greater levels of pain, stiffness, and functional impairment (Thanaya et al., 2021).

The WOMAC index has been translated into Indonesian by Karsten et al. and subsequently validated for use in patients with knee osteoarthritis (Karsten et al., 2019). In addition, A study further validated the Indonesian version of the WOMAC for application in both pre-elderly and elderly populations with knee and hip OA, supporting its broader clinical utility across age groups and joint involvement (Hartana et al., 2024).

The management of OA involves both non-pharmacological and pharmacological strategies. Non-pharmacological approaches include invasive and non-invasive interventions, typically implemented by a multidisciplinary team, including specialists in Physical Medicine and Rehabilitation. The main objectives are to alleviate pain, optimize joint function, reduce activity limitations, enhance quality of life, and slow disease progression. Recommended non-pharmacological interventions include patient education, weight loss for overweight or obese individuals, and structured exercise programs such as tai chi and yoga. Additional modalities may involve the use of assistive devices (e.g., canes, walkers), braces, kinesiotaping, orthotics, thermotherapy, acupuncture, transcutaneous electrical nerve stimulation (TENS), radiofrequency ablation, and low-level laser therapy (LLLT) (Hellmi et al., 2021).

Pharmacological treatment options include acetaminophen, oral and topical nonsteroidal anti-inflammatory drugs (NSAIDs), duloxetine, and pregabalin (particularly for neuropathic pain when used in combination with NSAIDs), as well as tramadol for moderate to severe pain. Intra-articular corticosteroid injections are indicated for cases with acute or chronic inflammation, while hyaluronic acid injections are considered for patients with KL grade 1–3 OA who are unresponsive to conventional treatments (Hellmi et al., 2021).

Surgical interventions may be considered in advanced cases and include total knee arthroplasty, partial knee replacement, osteotomies, arthroscopy, and cartilage repair procedures. Emerging therapies—such as cell-based treatments (e.g., autologous chondrocyte implantation, mesenchymal stem cells) and gene therapy—are also being investigated for their potential in modifying disease progression (Jang et al., 2021). According to the Indonesian Rheumatology Association, several therapies—including platelet-rich plasma (PRP) injections, prolotherapy, botulinum toxin injections, diacerein, oral hyaluronic acid, chondroitin sulfate, glucosamine, curcumin extract, and *mahkota dewa* extract—are not currently recommended, though future research may alter these guidelines (Hellmi et al., 2021).

Despite the growing burden of OA, no published data are currently available on the clinical and functional characteristics of OA patients in Gianyar Regency, Bali. Therefore, this study aims to describe the demographic and functional profile of patients with knee OA to support evidence-based strategies for future management and intervention planning.

Method

This study employed a descriptive observational design with a cross-sectional approach. Data collection was conducted during a single patient visit to the Physical Medicine and Rehabilitation outpatient clinic at Sanjiwani General Hospital, Gianyar. The study population consisted of patients diagnosed with knee osteoarthritis who presented to the rehabilitation clinic. A consecutive sampling method was used, whereby all eligible patients who met the inclusion criteria and consented to participate were

included in the study. The minimum required sample size was calculated to be 12 subjects, based on a 95% confidence level and a 10% margin of error.

Inclusion criteria:

- Patients diagnosed with knee osteoarthritis attending the Physical Medicine and Rehabilitation outpatient clinic at Sanjiwani General Hospital, Gianyar.
- Willingness to participate, indicated by completing the informed consent form.

Exclusion criteria:

- Patients diagnosed with other musculoskeletal conditions in addition to osteoarthritis.

Result and Discussion

1. Result

Study Setting and Participants

Sanjiwani General Hospital in Gianyar is a Type B hospital that has received full accreditation. The Physical Medicine and Rehabilitation outpatient clinic has been operational since 2017. Data collection was conducted from June to July 2025. A total of 17 patients were assessed; 13 met the inclusion criteria and were enrolled in the study, while 4 were excluded based on exclusion criteria.

Participant Characteristics

The demographic and clinical characteristics of the study participants are summarized in the table 1.

Table 1
Participant Characteristics (n = 13)

No	Characteristic	Category	Frequency	Percentage (%)
1	Age (years)	41–50	3	23.0
		51–60	4	30.7
		61–70	2	15.3
		71–80	4	30.7
2	Gender	Male	4	30.8
		Female	9	69.2
3	Body Mass Index	<18.5 (Underweight)	0	0.0
		18.5–24.9 (Normal)	6	46.1
		25–29.9 (Overweight)	6	46.1
		30–34.9 (Grade I Obesity)	0	0.0
		35–39.9 (Grade II Obesity)	1	7.6
		≥40 (Grade III Obesity)	0	0.0
4	Occupation	Private sector	5	38.4
		Civil servant	3	23.0
		Retired	3	23.0
		Homemaker	2	15.3

Most participants were aged 61 years or older, and the majority were female. The body mass index of participants ranged from normal to overweight. The most common occupation was in the private sector. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Scores

Table 2
Total WOMAC Score Categories

No	Score Category	Frequency	Percentage (%)
1.	≤60 (Mild)	9	69.3
2.	61–80 (Moderate)	4	30.7
3.	≥81 (Severe)	0	0.0

Most participants had WOMAC scores falling within the mild category.

Table 3
Mean Scores of WOMAC Subscales

No	Subscale	Mean Score	Maximum Score
1.	Pain	10	20
2.	Stiffness	3	8
3.	Function	30	68

The average scores across all WOMAC subscales indicated non-severe symptoms, reflecting relatively mild pain, stiffness, and functional limitations among the participants.

2. Discussion

In this study, the most frequent age group was ≥61 years, aligning with previous research showing that most knee OA patients are over 60 years old (Putra et al., 2019; Ghassani & Idris, 2023). The higher prevalence in older adults is largely due to age-related physiological changes, including decreased muscle strength, impaired proprioception, and reduced chondrocyte responsiveness to growth factors such as insulin-like growth factor-1 (IGF-1) and transforming growth factor-beta (TGF-β). These changes limit extracellular matrix (ECM) synthesis, impair tissue repair, and increase susceptibility to mechanical stress, creating a joint microenvironment conducive to OA progression (Ghassani & Idris, 2023; Zhao et al., 2024).

The majority of patients were female, consistent with Li et al. (2024), who reported that of 364.58 million individuals with OA, 225.16 million were women. Similar findings were observed in other studies, with 59.1% (Putra et al., 2019) and 86.8% (Ghassani & Idris, 2023) of knee OA patients being female. The higher prevalence in women has been attributed to hormonal changes, anatomical differences in joint structure, and higher obesity rates, which are strongly associated with knee OA (Coaccioli et al., 2022).

Most participants had a Body Mass Index (BMI) ≥25. Recent evidence suggests that obesity and metabolic syndrome components, such as dyslipidemia and insulin resistance, play significant roles in the onset and progression of knee OA, beyond the mechanical burden of excess weight (Shumnalieva et al., 2023). A study by Ronald Vinantius Munthe involving 30 knee OA patients revealed a relationship between BMI and OA incidence, indicating that those with BMI >24.9 had more pronounced joint space narrowing (Munthe et al., 2021).

A systematic review and meta-analysis found that low muscle mass and sarcopenic obesity were associated with an increased risk of knee OA (Wu et al., 2024). Additionally, some studies support diabetes as an independent risk factor for OA. Research examining metabolic risk factors showed a significant association between impaired glucose

tolerance and knee OA, even after adjusting for age and sex, though not with BMI (Coaccioli et al., 2022).

The majority of participants in this study were worked in the private sector, such as traders and farmers. Occupations that involve walking while carrying heavy loads have been associated with an increased risk of developing knee osteoarthritis compared to more sedentary types of work (Lo et al., 2022).

Most Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were in the mild category, indicating that participants generally had a good functional status. Some subjects were undergoing ongoing rehabilitation therapy, while others were attending their initial consultation with a physical medicine and rehabilitation specialist. A key limitation of this study is the relatively small sample size and short data collection period, which resulted from the limited population of knee osteoarthritis patients attending the clinic. This constraint may limit the generalizability of the findings; however, the available sample offers a preliminary overview of the functional status within this patient population. Future studies should involve a larger sample size, longer study duration, and a broader range of variables.

Conclusion

This study, utilizing the WOMAC questionnaire, demonstrated that patients with knee osteoarthritis generally experienced mild functional limitations, with minimal interference in their daily activities.

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