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RESEARCH ARTICLE

Functional assessment of knee osteoarthritis in the hospital outpatient care unit

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Abstract

Background: Osteoarthritis is a joint cartilage disease that affects a patient's quality of life as it limits the patient's movement, reduces the ability to work, increases emotions, and leads to long-term depression. **Objective:** To report the functional status of Knee OA in outpatient care at Ulin Hospital Banjarmasin, Indonesia. **Method:** A cross-sectional study was conducted with a functional assessment of the patient's medical record data. The Western Ontario and McMaster University Osteoarthritis Index (WOMAC) instruments were used. Fifty-one respondents participated in the study. **Result:** Most respondents were female (86.27%), 50–59 years old (33.33%), and suffered from OA for less than one year (35.29%). In addition, 24 patients (47%) suffered from mild OA, and 27 patients (53%) had moderate OA, reflecting that patients might have issues with their physical function. Of all participants, 60.78% had grade three OA by Kellgren Lawrence's severity classification; others had grade two. All patients received intraarticular injections of hyaluronic acid. **Conclusion:** There was no statistically significant difference between the WOMAC score and the gender, age, degree of OA and duration of OA. Hence, this illustrates that patients would suffer more from OA along with disease progression.

Introduction

Osteoarthritis (OA) is a chronic disease that attacks the joints and is one of the most common diseases in society. It coincides with decreased cartilage function and changes in joint shape, leading to joint damage and pain. This affects the patient's quality of life (Gorial *et al*., 2018). OA is the most prevalent bone and joint disorder worldwide. By 2032, nearly 30% of the population aged 45 years and over will be diagnosed with OA (Safiri *et al*., 2020). OA is also common in Indonesia. It was estimated that 40% of the elderly population have OA, which limits the mobility and physical function of the patients (Maryani *et al*., 2019).

Knee OA, one of the most common forms of OA, is the major contributor to physical disability in patients. Knee OA pain has caused activity restriction, particularly walking, sitting and standing up, climbing up and down the stairs, and reaching out for something of which these activities are part of daily routine activities (Al-Khlaifat *et al*., 2020) As knee OA progresses, the pain's severity can affect the patient's functional status. Severe pain and functional limitation are salient characteristics that are evident in patients with OA (Mohd Yusuf *et al*., 2022).

Whilst most patients with knee OA can be conservatively managed in the outpatient setting, they often fail to recognise the case-sensitive conditions and increased risk of hospitalisation due to disease severity and morbidity, particularly for those who use intraarticular hyaluronic acid injections (IAHA) therapy. IAHA may delay the time to surgery and total knee replacement (Maheu *et al*., 2019).

IAHA injection has a positive effect on reducing pain and improving functional status in patients with knee OA, especially in patients with mild-to-moderate knee OA (Bhandari *et al*., 2017). More importantly, the

injection can be planned for one year, particularly for younger patients. However, the long-term efficacy of IAHA may vary across patients with some patients experiencing a lesser duration of effectiveness (Maheu *et al*., 2019). Therefore, this study investigated the relationship between pain severity and functional status of individuals with knee OA treated with IAHA injection.

Methods

Design

A cross-sectional study was conducted from January to April 2022 in the Rheumatology outpatient clinic at Ulin Hospital Banjarmasin, Indonesia. Respondents were recruited using an accidental sampling method with a sample of 51 patients. Only patients diagnosed with knee OA who had undergone outpatient care could participate in this study. In addition, patients who had received IAHA at least five times and were willing to participate were recruited.

Demographic data, such as gender, age, and duration of OA were extracted from the medical records. The patient's clinical condition, including the OA grade using the Kellgreen Lawrance scale, pain severity using the Visual Analog Scale (VAS), and functional status using The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), was also measured. The data was taken during patient visits and recorded in the medical report.

Statistical analysis

All data were evaluated with descriptive statistics. In addition, a chi-square test was performed to determine whether there was a significant difference between patient demographic characteristics.

Ethical approval

This research received ethical approval from Ulin Hospital Banjarmasin with number No 133/XII-Reg Riset/RSUD/2021.

Results

Most respondents were female, 86.27%, and most respondents were aged 50-59 years, which made up 33.33% of the whole respondents. Regarding the degree of OA, the most prevalent OA was the Kellgreen Lawrence three grades with 60.78%, and the most prolonged OA illness was less than one year, namely 35.29%. The results of the hypothesis testing (Table I) show that WOMAC Score with gender, age, degree of OA, and duration of OA, there was no statistically significant difference ($p < 0.05$) (Table I).

Table I: Characteristics of respondents (n = 51)

Characteristics		n (%)	WOMAC score	*p*-value*
Gender				
	Male	7 (13.73)	31.71±12.26	0.811
	Female	44 (86.27)	26.09±10.25	
Age (years)				
	< 40	2 (3.92)	28.67±6.66	
	40-49	10 (19.61)	27.22±4.87	
	50-59	17 (33.33)	29.71±12.82	0.343
	60-69	16 (31.37)	23.75±10.37	
	> 70	6 (11.76)	25.67±12.45	
Degree of OA				
	0	0 (0)		
	1	0 (0)		
	2	20 (39.22)	23.65±10.02	0.361
	3	31 (60.78)	28.94±10.58	
	4	0 (0)		
Duration of OA (years)				
	< 2	31 (60.78)	26.84+11.20	
	3-4	14 (27.45)	26.36+9.06	0.606
	< 5	6 (11.77)	28.17+12.42	

*Significance is determined at $p < 0.05$

Patients only had two conditions according to the WOMAC score results: no to mild (47.06%) and moderate (52.92%) as shown in Table II. The VAS score showed a four-point decrease in pain level after IAHA was injected into both patients in the categories of mild and moderate (Table III).

Table II: The WOMAC score of respondents (n=51)

Category	Pain	Stiffness	Function	Total score*	N (%)
Mild	5.17±1.6	0.83±1.09	11.38±3.05	17.38 ± 3.27	24 (47.06)
Moderate	8.04±2.14	4.39±1.40	22.78±6.67	35.30 ± 7.03	27 (52.94)
Severe	0	0	0	0	0 (0.00)
Extremely	0	0	0	0	0 (0.00)

*WOMAC score category: mild (0-24), moderate (24-48), severe (48-72), and extreme (72-96)

Table III: VAS score of respondents (n=51)

Category*	Before	After	Reduction	N (%)
Mild	5.00 ± 0.00	1.00 ± 0.00	4.00 ± 0.00	24 (47.06)
Moderate	5.19 ± 0.40	1.19 ± 0.40	4.00 ± 0.40	27 (52.94)

*Score range 0-10, with a score of 10 reflecting the worst possible pain

Discussion

OA is a form of joint disorder and a significant cause of discomfort and disability. Knee OA has three symptoms, i.e. decreased function, stiffness, and constant knee pain, and three physical signs, i.e. limited movement, crepitus, and bony enlargement. Pain is usually associated with frequent activity, which may get worse during weight-bearing activities and may reduce when taking rest (Testa *et al*., 2021). IAHA therapy significantly improved pain outcomes as compared to placebo or non-intervention in the meta-analysis study (Bhandari *et al*., 2017). Clinicians can identify patient and treatment responses that can be used as guidelines for using IAHA. Some of the data obtained include the following: suitable for patients with mild to moderate knee OA and Patients aged ≥60 years. Patients who respond positively are less likely to undergo knee arthroplasty in the short term (Bowman *et al*., 2018). Pain is a unique experience, very personal and subjective, and so it is difficult to assess the severity and intensity of the pain a person experiences (Wang *et al*., 2018).

This study has demonstrated that women are vulnerable to Knee OA, particularly in older age. According to the Riskesdas (Indonesian Basic Health Research) of 2018, females are more vulnerable to OA (8.46%) as compared to males (6.13%) (Kemenkes RI, 2019). Menopause is a risk factor for knee OA in women due to oestrogen deficiency. Oestrogen regulates cartilage metabolism by protecting its biomechanical structure and function. Oestrogen deficiency leads to bone resorption and articular cartilage degeneration, causing low Bone Mineral Density (BMD). Abnormalities in BMD can be used as an indicator of OA risk. High Body Mass Index (BMI) and low BMD values are often found in women suffering from knee OA (Achmad *et al*., 2023). Symptomatic Knee OA will develop in adults by age 65 or older (Freystaetter *et al*., 2020).

It is interesting to notice that most patients have recently suffered from OA, yet they have a high degree of OA. This reflected that functional status can quickly worsen in individuals with OA. Approximately one out of seven people with knee OA experienced sudden progression to advanced radiographic disease within 12 months after being diagnosed with OA. This can be one of the risk factors and natural history of accelerated knee osteoarthritis (AKOA), the transition from knee osteoarthritis without radiography and to advanced stage disease < 4 years (Driban *et al*., 2020).

There is no positive correlation between functional impairment and demographic characteristics, reflecting that degradation and loss of articular cartilage in the case of OA are not influenced by the socioeconomic status of the patient. The patient will suffer from OA regardless of their individual characteristics. Pain will increase with movement and may disrupt functional status in the long term (Nigam *et al*., 2021). The pain that appears can cause a decrease in physical performance and contribute to a decrease in the quality of life of OA individuals (Boyer & Hafer, 2019).

Worsened function is likely to happen. IAHA has been widely used as it presents a low risk of complications while providing potential pain relief and improving physical function. Patients who received IAHA injections might experience less pain, allowing them time for better pain management. This study strengthened this fact since the VAS score for pain was decreased after IAHA injection. However, it is important to observe the effect in the longer term since the therapeutic effect of IAHA tends to wane after one year of treatment (Kim *et al*., 2020).

Conclusion

This study highlighted the decrease in the WOMAC Score and VAS values. However, there is no statistically significant association between these values and patients' demographic and functional status (gender, age, degree of OA, and duration of OA). Further studies are required to examine the effectiveness of using IAHA in long-term treatment.

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Conflict of Interest

The authors declare no conflict of interest.

References

Achmad, A., Suharjono, Soeroso, J., Suprapti, B., Siswandono, Pristianty, L., Rahmadi, M., Nugraha, J., Surya, Y., Isma, S. P. P., Rahadiansyah, E., Fahmi, I., & Wilujeng, C. S. (2023). The relationship of body mass index and T score in healthy and knee osteoarthritis women. *Pharmacy Education*, **23**(4), 321–324. https://doi.org/10.46542/pe.2023.234.321324

Al-Khlaifat, L., Okasheh, R., Muhaidat, J., Hawamdeh, Z. M., Qutishat, D., Al-Yahya, E., Al-Ajlouni, J. M., & Mohammad, M. T. (2020). Knowledge of knee osteoarthritis and its impact on health in the Middle East: Are they different to countries in the developed world? A qualitative study. *Rehabil Res Pract*, **2020**, 9829825. https://doi.org/10.1155/2020/9829825

Bhandari, M., Bannuru, R. R., Babins, E. M., Martel-Pelletier, J., Khan, M., Raynauld, J. P., Frankovich, R., McLeod, D., Devji, T., Phillips, M., Schemitsch, E. H., & Pelletier, J. P. (2017). Intra-articular hyaluronic acid in the treatment of knee osteoarthritis: A Canadian evidence-based perspective. *Ther Adv Musculoskelet Dis*, **9**(9), 231–246. https://doi.org/10.1177/1759720X17729641

Bowman, E. N., Hallock, J. D., Throckmorton, T. W., & Azar, F. M. (2018). Hyaluronic acid injections for osteoarthritis of the knee: Predictors of successful treatment. *Int Orthop*, **42**(4), 733–740. https://doi.org/10.1007/s00264-017-3731-8

Boyer, K. A., & Hafer, J. F. (2019). Gait mechanics contribute to exercise induced pain flares in knee osteoarthritis. *BMC Musculoskelet Disord*, **20**(1), 107. https://doi.org/10.1186/s12891-019-2493-4

Driban, J. B., Harkey, M. S., Barbe, M. F., Ward, R. J., MacKay, J. W., Davis, J. E., Lu, B., Price, L. L., Eaton, C. B., Lo, G. H., & McAlindon, T. E. (2020). Risk factors and the natural history of accelerated knee osteoarthritis: A narrative review. *BMC Musculoskelet Disord,* **21**(1), 332. https://doi.org/10.1186/s12891-020-03367-2

Freystaetter, G., Fischer, K., Orav, E. J., Egli, A., Theiler, R., Munzer, T., Felson, D. T., & Bischoff-Ferrari, H. A. (2020). Total serum testosterone and Western Ontario and McMaster Universities osteoarthritis index pain and function among older men and women with severe knee osteoarthritis. *Arthritis Care Res (Hoboken)*, **72**(11), 1511–1518. https://doi.org/10.1002/acr.24074

Gorial, F. I., Anwer Sabah, S. A., Kadhim, M. B., & Jamal, N. B. (2018). Functional ztatus in knee osteoarthritis and its relation to demographic and clinical features. *Mediterr J Rheumatol*, **29(**4), 207–210. https://doi.org/10.31138/mjr.29.4.207

Kemenkes RI. (2019). I*ndonesian Basic Health Research 2018* (978-602-373-118-3). Ministry of Health Republic of Indonesia.

Kim, Y. S., Suh, D. S., Tak, D. H., Chung, P. K., Kwon, Y. B., Kim, T. Y., & Koh, Y. G. (2020). Comparative matched-pair cohort analysis of the short-term clinical outcomes of mesenchymal stem cells versus hyaluronic acid treatments through intra-articular injections for knee osteoarthritis. *J Exp Orthop*, **7**(1), 90. https://doi.org/10.1186/s40634-020-00310-1

Maheu, E., Bannuru, R. R., Herrero-Beaumont, G., Allali, F., Bard, H., & Migliore, A. (2019). Why we should definitely include intra-articular hyaluronic acid as a therapeutic option in the management of knee osteoarthritis: Results of an extensive critical literature review. *Semin Arthritis Rheum*, **48**(4), 563–572. https://doi.org/10.1016/j.semarthrit.2018.06.002

Maryani, N. T., Nadjib, M., & Utomo, P. (2019). Cost Effectiveness analysis of the total hip replacement therapy for hip osteoarthritis: A systematic review. *The 6th International Conference on Public Health 2019, Solo.*

Mohd Yusuf, S. Y., Md-Yasin, M., & Mohd Miswan, M. F. (2022). Does less pain predict better quality of life among Malaysian patients with mild-moderate knee osteoarthritis? *Clin Pract,* **12**(2), 219–230. https://doi.org/10.3390/clinpract12020026

Nigam, A., Satpute, K. H., & Hall, T. M. (2021). Long term efficacy of mobilisation with movement on pain and functional status in patients with knee osteoarthritis: A randomised clinical trial. *Clinical Rehabilitation,* **35**(1), 80–89. https://doi.org/https://doi.org/10.1177/0269215520946932

Safiri, S., Kolahi, A. A., Smith, E., Hill, C., Bettampadi, D., Mansournia, M. A., Hoy, D., Ashrafi-Asgarabad, A., Sepidarkish, M., Almasi-Hashiani, A., Collins, G., Kaufman, J., Qorbani, M., Moradi-Lakeh, M., Woolf, A. D., Guillemin, F., March, L., & Cross, M. (2020). Global, regional and national burden of osteoarthritis 1990-2017: A systematic analysis of the Global Burden of Disease Study 2017. *Ann Rheum Dis,* **79**(6), 819–828. https://doi.org/10.1136/annrheumdis-2019-216515

Testa, G., Giardina, S. M. C., Culmone, A., Vescio, A., Turchetta, M., Cannavo, S., & Pavone, V. (2021). Intra-articular injections in knee osteoarthritis: A review of literature. *J Funct Morphol Kinesiol,* **6**(1). https://doi.org/10.3390/jfmk6010015

Wang, K., Kim, H. A., Felson, D. T., Xu, L., Kim, D. H., Nevitt, M. C., Yoshimura, N., Kawaguchi, H., Lin, J., Kang, X., & Zhang, Y. (2018). Radiographic knee osteoarthritis and knee pain: Cross-sectional study from five different racial/ethnic populations. *Sci Rep*, **8**(1), 1364. https://doi.org/10.1038/s41598-018-19470-3