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CORRESPONDING AUTHOR:
Anjan Khadka
Department of Pharmacology, College of Medicine, Nepalese Army Institute of Health Sciences, Shree Birendra Hospital, Chhauni, Kathmandu Nepal.
Email: anjankhadka14@gmail.com
ORCID:https://orcid.org/0000-0002-1540-6316

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Evaluation of Drug Use Patterns for Pain Management in Patients with Knee Osteoarthritis Undergoing Physiotherapy in a Tertiary Care Teaching Hospital

Anjan Khadka[1], Madan Gautam[2], Mohit Thapa Magar[3], Ajay Kumar Yadav[4], Riya Jaiswal[5], Sharmila Lamichhane[6]

[1] Department of Pharmacology, College of Medicine, Nepalese Army Institute of Health Sciences (NAIHS), Shree Birendra Hospital, Chhauni, Kathmandu, Nepal.
[2] Department of Physiotherapy, College of Medicine, Nepalese Army Institute of Health Sciences (NAIHS), Shree Birendra Hospital, Chhauni, Kathmandu, Nepal.
[3] Department of Orthopedics, College of Medicine, Nepalese Army Institute of Health Sciences (NAIHS), Shree Birendra Hospital, Chhauni, Kathmandu, Nepal.
[4] Department of Orthopedics, Scheer Memorial Adventist Hospital, Banepa, Kavre, Nepal.
[5] Nepalese Army Institute of Health Sciences (NAIHS), Chhauni, Kathmandu, Nepal.
[6] Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal.

ABSTRACT

Introduction: Osteoarthritis is becoming more common, and there is no definitive treatment for it. Medications like opioids, non-steroidal anti-inflammatory drugs, and steroids are used to relieve the pain of osteoarthritis in addition to physiotherapy. The pattern of use of medications for osteoarthritis varies widely with the chance of inappropriate drug combinations.

Objective: To assess the drug use patterns for pain management in patients with knee osteoarthritis undergoing physiotherapy in a tertiary level teaching hospital.

Methodology: A descriptive cross-sectional study was conducted in patients with knee osteoarthritis attending Physiotherapy department, Nepalese Army Institute of Health Sciences after IRC approval (Reg. No.:724 dated Dec 2022 from January 2023 to December 2023. The prescription of 115 patients were included to determine the prescribing indicators laid down by World Health Organization. The data were analyzed using descriptive statistics.

Results: This study found female preponderance in disease occurrence and the average age was 66.12±6.71 years. Bilateral knee osteoarthritis was common (75.65%). NSAIDs (94.78%) were the most commonly prescribed class of drugs. Combination of analgesic-NSAIDs/Opioids and gastro protective agents (59.13%) were mainly prescribed and the average number of drugs per prescription was found to be 2.23.

Conclusion: The finding of this study revealed NSAIDs as commonly prescribed drug and the two drug combination regimens as most commonly preferred regimen in the treatment of osteoarthritis.

INTRODUCTION

Osteoarthritis (OA), the most common form of arthritis, is a leading cause of disability and has a great impact on public health.[1] It is the chronic inflammatory joint disease, commonly affecting knees, hands, feet, hips, fingers, and/or lower spinal regions, causing gradual cartilage loss.[1,2] With the aging of the population and rising rates of obesity, the prevalence of knee OA is increasing.[2] To date, there is no known cure for OA, and patients with knee OA are managed with palliative care. Several therapies are available to alleviate the symptoms of OA. Nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and symptomatic slow acting drugs in osteoarthritis (SYSADOA-glucosamine, hyaluronic acid, diacerein and chondroitin sulfate) are the most commonly used treatment options for pain relief and joint function improvement.[3] guidelines of treatment of OA knee recommend these drugs and intra-articular injection of corticosteroids also has been used to treat knee OA.[3, 4] As a result, the use of different drugs for knee OA in clinical practice varies greatly. In clinical practice,

physicians typically select a treatment for knee OA based on the treatment's effects and adverse events, regardless of health care costs or patient safety.[5] Several studies revealed that the polypharmacy (use of 5 or more than 5 medicines) is prevalent among OA patients and is related to worse self-reported health status and there may have adverse medication combinations as well.[6-8] Multiple pain-relieving drugs are prescribed for patients with osteoarthritis (knee) and their use pattern has not established yet in our setting. Hence, this study was planned to assess the drug use patterns for pain management in patients with knee osteoarthritis undergoing physiotherapy.

METHODOLOGY

A cross-sectional study was conducted in the Physiotherapy department Nepalese Army Institute of Health Sciences after getting approval from Institutional Review Committee (IRC) (Reg. No.:724 dated Dec 2022). The data were collected from January 2023 to December 2023 in a structured proforma from the prescription of patient with osteoarthritis (knee) who was referred from the orthopedic department for physiotherapy session and managed conservatively and willing to be included in the study. Patients with multiple chronic comorbid conditions like diabetes, hypertension and other traumatic injuries were excluded from the study. Proforma included the patient's demographic details (age and gender) and the World Health Organization (WHO) prescribing indicators. The WHO prescribing indicators were included viz. average number drugs per prescriptions, percentage of the drugs prescribed by generic name, percentage of prescription with injection prescribed, percentage of prescriptions with antimicrobial prescribed and percentage of drugs prescribed from an essential drug list (National list of Essential Medicines, Nepal 2021).[9-11] All the data were recorded in MS Excel version 2010 and descriptive analysis were performed using frequency, bar diagram, table, mean and standard deviation.

RESULTS

A total of 115 patient's prescriptions were analyzed. The number of female patients was 68 (59.13%) and male was 47 (40.87%). The minimum age of the patients was 36 and maximum was 84 with mean of 66.12±6.71 years. The details of age and gender distribution are shown in figure 1. Eighty-seven patients were affected with osteoarthritis knee bilaterally and twenty-eight patients had unilateral osteoarthritis of knee. Among 87 patients with bilateral knee osteoarthritis, 58 (66.67%) female and 29 (33.33%) were male. Similarly, out of 28 patients with unilateral knee osteoarthritis, 10 (35.71%) were female and 18 (64.29%) were male.

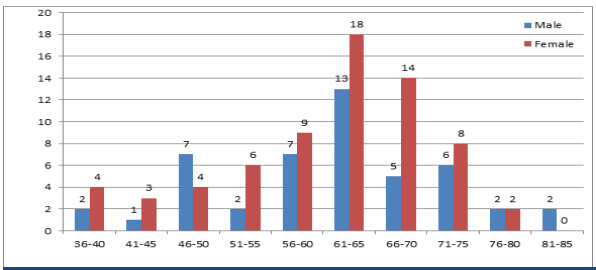

Fig 3: Age and Gender wise distribution of patients with OA (knee)

Study found that NSAIDs were the most commonly prescribed class of drugs in osteoarthritis followed by gastroprotective agents as shown in Table 1. Among NSAIDs, use of aceclofenac was highest which accounted for 47.7% followed by diclofenac (22.93%), paracetamol (14.67%), celecoxib (9.17%), naproxen (3.66%) and lastly indomethacin (1.83%). Among gastroprotective agents, pantoprazole (42.1%) was the drug most commonly used followed by esomeprazole (32.63%), omeprazole (22.1%) and ranitidine (3.15%) which was the least.

Table : Prescribed pattern of drugs in osteoarthritis

Drug Class	Drugs	Number of drugs prescribed
NSAIDs (109)	Aceclofenac	52
	Diclofenac	25
	Paracetamol	16
	Celecoxib	10
	Naproxen	4
	Indomethacin	2
Opioids (5)	Tramadol	5
Glucocorticoids (7)	Methylprednisolone	6
	Prednisolone	1
Gastro protective agents (95)	Pantoprazole	40
	Esomeprazole	31
	Omeprazole	21
	Ranitidine	3
Others (41)	Chondroitin sulfate and Glucosamine	35
	Diacerein	6

The prescribed pattern of different regimen of drugs used in osteoarthritis tabulated in table 2.

Among one drug only regimen, paracetamol was the drug most commonly used (70.58%) followed by methylprednisolone (11.76%), glucosamine (11.76%) and tramadol (5.88%). Among two drugs combination regimen, it was found that use of aceclofenac + pantoprazole/esomeprazole/omeprazole (39.7%) was the highest followed by diclofenac + pantoprazole/esomeprazole/omeprazole (26.47%) and celecoxib + pantoprazole/esomeprazole/omeprazole (8.82%). Regarding the three drugs combination regimen, aceclofenac + pantoprazole/esomeprazole/omeprazole + glucosamine (60.71%) was prescribed the most followed by diclofenac + pantoprazole/esomeprazole + glucosamine (21.42%) and celecoxib + pantoprazole/esomeprazole + diacerein (10.71%). Among four drugs combination regimen, aceclofenac + esomeprazole + methylprednisolone + glucosamine (60%) was the combination most commonly used followed by diclofenac + pantoprazole + methylprednisolone + glucosamine (20%) and celecoxib + pantoprazole + prednisolone + glucosamine (20%).

Table 2: Prescribed pattern of combination of drugs in osteoarthritis

Regimen	Drugs in combination	Number
One drug only (17)	Paracetamol	12
	Tramadol	1
	Methylprednisolone	2
	Glucosamine	2
Two drugs combination (One Analgesic-NSAIDs/ Opioids+ One gastro protective agents) (68)	Aceclofenac + Pantoprazole/esomeprazole/omeprazole	27
	Aceclofenac + Ranitidine	3
	Diclofenac + Pantoprazole/esomeprazole/omeprazole	18
	Paracetamol + Pantoprazole/esomeprazole/omeprazole	4
	Celecoxib+ Pantoprazole/esomeprazole/omeprazole	6
	Naproxen+ Pantoprazole/esomeprazole/omeprazole	4
	Indomethacin+ Pantoprazole/esomeprazole/omeprazole	2
	Tramadol+ Pantoprazole/esomeprazole/omeprazole	4
Three drugs combination (One NSAIDs + One gastro protective agents + symptomatic slow-acting drug in OA) (28)	Aceclofenac + Pantoprazole/esomeprazole/omeprazole + Glucosamine	17
	Aceclofenac + Esomeprazole + Diacerein	2
	Diclofenac + Pantoprazole/esomeprazole + Glucosamine	6
	Celecoxib + Pantoprazole/esomeprazole + Diacerein	3
Four drugs combination (One NSAIDs + Glucocorticoids + One gastro protective agents + symptomatic slow-acting drug in OA) (5)	Aceclofenac + Esomeprazole + Methylprednisolone + Glucosamine	3
	Diclofenac + Pantoprazole + Methylprednisolone + Glucosamine	1
	Celecoxib + Pantoprazole+ Prednisolone + Glucosamine	1

WHO prescribing indicators are shown in table 3. Average number of drugs per prescription was found to be 2.23. Percentage of the drugs prescribed by generic name was 56.42% while percentage of prescription with injection was found to be 2.33%. However, no any antimicrobial was prescribed. Lastly, percentage of drugs prescribed from an essential medicine list was 28.01%.

Table 3: WHO prescribing indicators

Prescribing indicators	Findings (%)
Average number of drugs per prescription	257/115
Percentage of the drugs prescribed by generic name	145/257
Percentage of prescription with injection prescribed	6/257
Percentage of prescriptions with antimicrobial prescribed	0
Percentage of drugs prescribed from an essential drug list	72/257

DISCUSSION

This study found that the knee osteoarthritis was more common in female with preponderance of 1.45. Study by Gupta R et al. in India, Adebusoye LA et al. in Nigeria and Park HR et al. in Korea showed similar female preponderance with 1.38, 1.47 and 2.5 respectively.[12-14] The reasons behind higher prevalence of knee osteoarthritis in female could be hormonal factors (postmenopausal decline in cartilage protective estrogen level), variations in the anatomy and biomechanics of joints where women generally have wider pelvis with larger angle between thighbone and shinbone (i.e. Q-angle), increased joint and ligamentous laxity in women leading to abnormal loading that hastens the degenerative process, increased tension on the joint surfaces and joint instability caused by weak or imbalance muscles supporting the knee.[15-17]

The majority of the patients in our study were above the age of 60 years (60.87%) with average of 66.12 years which is little more than the findings of Gupta R et al (61.7 years) and Park HR et al (63.2 years) but more than that of Adebusoye LA et al (47.3 years) and Mohammed et al (54.07 years).[12-14,18] Framingham Osteoarthritis study reported that from 33% in those 60–70 years old to 43.7% in people over 80 years old, the prevalence of OA rose with each decade of life and individuals had a 9.5% prevalence of symptomatic knee OA.[19] Over the time, the accumulation of damage on joints leads to the deterioration of cartilage, which is an essential element that provides cushioning between bones.[20] The ability of the joint to tolerate mechanical stress is reduced as a result of age-related changes in the composition and structure of cartilage as well as modifications in the dynamics of synovial fluid. Age-related bone density loss affects joint function and raises the incidence of osteoarthritis and also aging-related chronic low-grade inflammation promotes the deterioration of joint tissues.[20-22] Our study found that the bilateral knee (75.65%) were more affected which is in with accordance the findings from a 12 year prospective cohort study which reported 80% patient developing bilateral disease after 12 years.[23] Research has shown that people with unilateral knee osteoarthritis had abnormal biomechanics in the unaffected leg and that these patients exhibit asymmetries in their gait that eventually develop into bilateral osteoarthritis.[23]

Our study found that all 115 patients referred to Physiotherapy were using medications. Regarding the number of drugs, single drug was used in 17 patients (14.78%), of which, paracetamol (70.85%) was commonly used as single drug. Various other NSAIDs were found to be used in combination with gastroprotective agents and other drugs like steroids, glucosamine and diacerein. Aceclofenac (47.7%) being the commonly used NSAIDs in two drugs, three drugs and four drugs combination. Among two drugs combination regimen, proton pump inhibitors (PPIs) were another group and in three drug combination, steroid was added with initial two drugs and in four drug combination, either glucosamine or diacerein was added with latter. Our study findings are in congruent with the findings of Gupta R et al (aceclofenac 36%) but differ from study by Mohammed et al. (paracetamol 50.98%).[12,18] The two-drug combination regimen was most commonly used (59.13% of patients) in OA in our study. This finding is similar as of findings of Park HM et al which reported two drug combinations as most commonly used regimen (37.2%).[14] However, drugs used in their regimen vary between NSAIDs, SYSADOA, corticosteroids and analgesics. Our finding is in contrast to findings of Wilson N et al which reported three drug combination regimen (53.9% of patients) as most common regimen for OA.[24] NSAIDs and PPIs are frequently administered together to reduce the possibility of gastrointestinal problems brought on by NSAID use.[25] The chance of acquiring diseases like gastritis, stomach ulcers, or gastrointestinal bleeding is greatly decreased when PPIs and NSAID therapy are combined. By combining the therapeutic advantages of NSAIDs with the preventive benefits of PPIs, this co-prescription approach seeks to make the use of these drugs safer and more tolerable for those in need of anti-inflammatory or pain management.[25] SYSADOAs are typically administered in combination with NSAIDs.[26] Compared to NSAIDs, patients tolerate SYSADOA much better, and they can also improve clinical symptoms. Corticosteroids suppress phospholipase A2 activity and prevent the formation of eicosanoids generated from arachidonate, which is why they are prescribed for OA pain as well.[3, 5, 26, 27]

The average number of drugs per prescription in OA was to be 2.23 which are in lieu with finding of Ummat et al (2.62) and Gupta M et al (3).[28,29] This study found that there was no practice of polypharmacy for treatment of osteoarthritis. Our study reported 28.01% drugs prescribed from essential medicine list 2021 (Nepal) which is lesser than that of Gupta M et al (65%).[28, 29] Ummat et al reported only 1% drugs used parenterally whereas our study showed 2.33% and Subramanian A et al found 8.2% parenteral drug use.[29,30] More than half of the drug were prescribed in generic name. Generic names are often used by free health-care delivery providing institution like our study place to make the most of their resources and offer affordable healthcare options, opening up access to important drugs for a greater number of people.

CONCLUSION

This study found that two drug regimen was the most commonlypreferred in treatment of osteoarthritis. The gastroprotective agents were found to be used along with analgesics. Comprehending the medication patterns in osteoarthritis could lead to the development of more focus regimens, better patient care plans, and evidence-based methods for managing osteoarthritis in the knee.

LIMITATION OF THE STUDY

The study being dependent on readily available medical records missed changes in medication prescriptions or unable to check the patient adherence in orthopaedic outpatient department during follow up. Furthermore, the study was conducted in a single teaching hospital and did not include all relevant variables such as patient preferences or socioeconomic characteristics like obesity, use of drugs as per osteoarthritis grading, which would limit the generalizability of the results. These restrictions underline the necessity of interpreting the reported drug usage trends cautiously and present chances for further research to overcome these limitations.

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CONFLICT OF INTEREST None

FINANCIAL DISCLOSURE None

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