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Outcome of Intraarticular Steroid Injection and Physical Therapy in Osteoarthritic Knees: A Study on Tertiary Hospital in Bangladesh

Dr. M. Sharif Uddin[1*], Dr. Shahana Parvin[2]

[1]Junior Consultant, Department of Orthopaedic Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
[2]Medical Officer, Paba Urban Dispensary, Rajshahi, Bangladesh

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***Corresponding author:** Dr. M. Sharif Uddin

Abstract **Original Research Article**

Introduction: An estimated 30% of all general follow-up are due to osteoarthritis (OA). For decades, medical experts have used intraarticular (IA) corticosteroid injections to treat the pain and inflammation associated with osteoarthritis (OA). ***Objective:*** To evaluate the patient's functional improvement and clinical result, Evaluations of Intraarticular Steroid Injection Therapy in Osteoarthritis Knee were conducted. ***Methods:*** A prospective interventional non-randomized clinical study was conducted in the Department of Orthopaedic surgery, Rajshahi Medical College & Hospital, Bangladesh, from June 2019 to December 2020. A total number (n=54) of patients between 35 and 75 years with knee discomfort for at least three months with radiographic evidence of primary osteoarthritis, male or female, were included in the study. Then, they were split into A and B groups. They had 27 patients in each group, with each group being assigned a random number. There were 6 weeks of follow-up in both groups of patients. ***Results*:** 9 (33.3%) were male in group A, and 18 (66.7%) were female. In group B, 10 (37.0%) were male and 18 (63.0%) were female. The mean visual analogue scale (VAS) in group A and group B during pre-treatment were 6.22±1.60 and 7.15±1.56, respectively. The mean age of patients in groups A and B were 52.33±9.62 years and 52.29±9.67 years, respectively. The mean range of motion (ROM) during pre-treatment in group A and group B were 117.33±13.05 and 112.37±19.01, respectively. Meantime taken to walk 50 feet during pre-treatment in group A and group B were 18.22±2.39 and 18.81±2.13 minutes, respectively. After treatment in both groups, visual analogue scale (VAS), range of motion (ROM), time taken to walk 50 feet and range of motion (ROM) gradually increased, which were statistically significant. ***Conclusion:*** Steroid injection remains a regular feature in the management of osteoarthritis, particularly osteoarthritis of the knee, despite the lack of strong, convincing, and reproducible evidence that intraarticular therapy significantly changes the short-term outcome and even less the progression of osteoarthritis of the knee.

Key words: Osteoarthritis, Steroid Injection, Joint Pain, Rajshahi Medical College Hospital.

INTRODUCTION

Around 30 % of all general physician visits are attributed to osteoarthritis (OA), which is the most common type of arthritis [1]. It may be characterized as a set of disorders that cause joint symptoms and indicators and changes in the underlying bone and at the joint edges linked to deficient articular cartilage integrity. Primary or secondary (non-idiopathic) (associated with a known condition) [2]. By the time a person is 80 years old, OA is present by histological or radiographic criteria in almost 80 %, although only half of those persons exhibit symptoms [3]. Despite its wide range of manifestations, morbidity from OA is frequently associated with its high prevalence and a diminished capacity to conduct both occupational and non-occupational tasks. No longer is osteoarthritis a "degenerative" or "wear and tear" arthritis, but rather a dynamic biomechanical, biochemical, and cellular process [4]. There has been an increase in the understanding of osteoarthritis (OA) is a disease involving the whole joint, rather than just articular cartilage [5].

Symptoms are generally unilateral, although the presence of OA is virtually always bilateral. One side seems to be more affected than the other, even when bilateral symptoms. Osteoarthritis on one side may be caused by trauma. Osteoarthritis (OA) is not a systemic inflammatory disease, unlike systemic inflammatory arthritis (SIA). Osteoarthritis (OA) is characterized clinically by pain, joint swelling, and restricted mobility [6]. The illness is marked by isolated

erosive lesions, cartilage loss, subchondral sclerosis, cyst development, and massive osteophytes at the joint margins [7]. OA knee diagnosis is based on clinical and radiographic evidence. Reduce or eliminate pain and stiffness while maintaining or improving mobility to reduce or eliminate impairment in patients with osteoarthritis (OA) of the knee. Non-pharmacological analgesics, such as patient education, exercise, human contact, physiotherapy, assistive technology, patellar taping, and proper footwear, may also be used. Surgical intervention may sometimes be necessary [8].

According to the American College of Rheumatology (ACR), there are several pre-treatments for mild OA symptoms, including patient education, physical and occupational therapy, and other therapies. Treatments include non-opioid oral and topical analgesics. Patients who do not respond to this treatment regimen should be given non-steroidal anti-inflammatory medicines (NSAIDs). The corticosteroid injection is advised for individuals with knee OA, especially if there is evidence of local inflammation and joint effusion. Osteoarthritis patients experiencing pain in their knees are often recommended heat treatment (OA). Several musculoskeletal painful disorders might benefit from deep hyperthermia using localized microwave diathermy (MWD) [9]. OA patients have relied on intraarticular (IA) corticosteroid injections (CSIs) for decades to alleviate pain and reduce inflammation in the joints [10].

Intraarticular injections of corticosteroids have been shown to alleviate inflammation and discomfort while slowing the course of structural alterations in the joint [11]. Studying long-acting corticosteroid injections plus physical therapy for OA knees has been sparse. There has been research on these combined therapies' functional effects based on validated instruments, such as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). It is necessary to use a mix of non-pharmacologic and pharmaceutical therapy to treat OA knee because it includes complex biomechanical, biochemical, and cellular processes [12]. When treating knee osteoarthritis [13], this study uses a combination of intra-articular injections and physical therapy to see if it improves the patient's functional and clinical outcomes.

METHODS

This prospective non-randomized clinical study was conducted in the outpatient Department of Orthopaedic surgery, Rajshahi Medical College & Hospital, Bangladesh, from June 2019 to December 2020. Osteoarthritis with radiological evidence was defined as primary mono or bilateral knee osteoarthritis with pain lasting at least 6 months and a limitation/difficulty in knee mobility. Intraarticular injections with steroids or hyaluronic acid, previous knee surgery, congenital or acquired inflammatory or neurological diseases involving the knee, long-term NSAID or steroid treatment, pregnancy or breastfeeding, and contraindications to intraarticular injection were all exclusions from this study.

DATA COLLECTION

The 54 patients were divided randomly into groups A & B. Group A received NSAID (non-steroidal anti-inflammatory drugs). In both groups, the patients were observed for six weeks. Study parameters used to assess the disease activity & functional capability of the patients were: 1) Visual analogue scale (VAS), Range of motion (ROM) and 3) Western Ontario and McMaster Universities (WOMAC) index. After taking the formal consent of the patient, detailed history was taken, and a present data form was filled up for every patient. Past history of illness & any systemic disease was inquired cautiously.

DATA ANALYSIS

A thorough examination of the patient was carried out. CBC, ESR, and Hb %, RBS, Serum creatinine, urine for R/M/E, serum uric acid, and SGPT were performed as baseline tests. In addition, an X-ray was taken of the knee joints that were suspected of being damaged. The datasheet had all of the reports as they should have been. Each group was given a regular dose of medication on time. Every patient was monitored for up to six weeks. Statistical analysis was carried out using SPSS version 21.

RESULTS

The mean age of patients in groups A and B were 52.33±9.62 years and 52.29±9.67 years, respectively (Table I). 9 (33.3%) were male in group A, and 18 (66.7%) were female. In group B, 10 (37.0%) were male and 18 (63.0%) were female (table-II). In Group A, the highest number of patients had knee pain in both joins (48.1%), followed by right knee pain in 11 (40.7%) patients. Only 3 (11.1%) patients had pain in the left knee joint. In group B, more than half of the patients had knee pain in both joins (51.9%), followed by right knee pain in 9 (33.3%) patients. Only 4 (14.8%) patients had pain in the left knee joint (table-III). The mean visual analogue scale (VAS) in group A and group B during pre-treatment were 6.22±1.60 and 7.15±1.56, respectively. The mean range of motion (ROM) in groups A and B pre-treatment were 117.33±13.05 and 112.37±19.01, respectively.

Table-1: Distribution of patient by age group (N=54)

Age group	Group		*p*-value
	Group-A	Group-B	
<40	02 (07.4)	03 (11.1)	
40-49	12 (44.4)	09 (33.3)	
50-59	07 (25.9)	09 (33.3)	
60 and above	06 (22.3)	06 (22.3)	
Total	52.33 ± 9.62	52.29 ± 9.67	0.989

The study's 't-test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-2: Distribution of patients by sex (N=54)

Sex	Group		*p*-value
	Group-A	Group-B	
Male	09 (33.3)	10 (37.0)	
Female	18 (66.7)	17 (63.0)	
Total	27 (100.0)	27 (100.0)	0.776

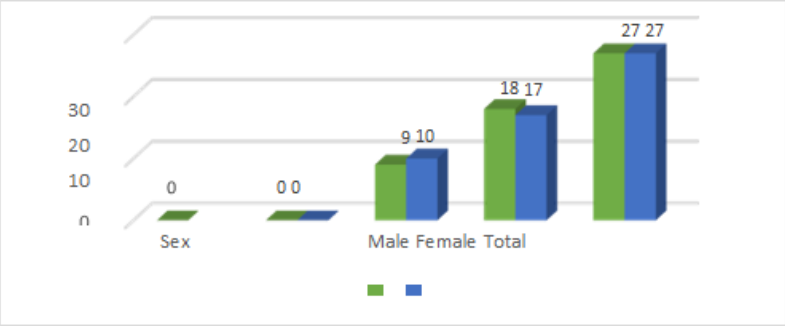

Fig-1: Distribution of patients by sex group.

A Chi-square test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-3: Distribution of patient by knee pain (n=54)

Knee pain	Group		*p*-value
	Group-A	Group-B	
Right	11 (40.7)	09 (33.3)	
Left	03 (11.1)	04 (14.8)	
Both	13 (48.1)	14 (51.9)	
Total	27 (100.0)	27(100.0)	0.827

A Chi-square test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-4: Distribution of patient according to characteristics of pain (n=54)

Analysis of pain	Group		*p*-value
	Group-A	Group-B	value
Onset			
Gradual	26(96.3)	22 (81.5)	0.083
After trauma	01(03.7)	05 (18.5)	
Site of pain			
Localized in knee	24(88.9)	23 (85.2)	0.685
Knee & Other Joints	03 (11.1)	04 (14.8)	
Time of occurrence			
Morning	13 (48.1)	16 (59.3)	0.413

Analysis of pain	Group		*p*-value
Evening	14 (51.9)	11 (40.7)	
Duration of pain			
Constant	20 (74.1)	22 (81.5)	0.513
Intermittent	07 (25.9)	5 (18.5)	
Radiation of pain			
Yes	01 (03.8)	03 (10.7)	
if yes, type			
Both	01 (03.8)	03 (10.7)	
Severity of pain			
Mild	04 (14.8)	01 (03.7)	0.348
Moderate	13 (48.1)	16 (59.3)	
Severe	10 (37.0)	10 (37.0)	

A Chi-square test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-5: Distribution of patient according to the examination of the knee (n=54).

Examination of the knee	Group			*p*-value
	Group-A		Group-B	
Contour	Normal	03(11.1)	02 (07.4)	0.639
	Swelling	24(88.9)	25 (92.6)	
Local	Absent	03(11.1)	04 (14.8)	0.685
Swelling	Present	24(88.9)	23 (85.2)	
Local	Normal	12(44.4)	08 (29.6)	0.260
Temperature	Raised	15(55.6)	19 (70.4)	
Eliciting	Absent	02(07.4)	01 (03.7)	0.552
fluctuation	Present	25(92.6)	26 (96.3)	
Leg length	Yes	02(07.4)	01 (03.7)	0.552
discrepancy	No	25(92.6)	26 (96.3)	
Deformity	Genu varus	07(25.9)	10 (37.0)	0.379
	No deformity	20(74.1)	17 (63.0)	

A Chi-square test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-6: Distribution of patient according to a test of the patella (n=54)

Test of patella		Group		*P*-value
		Group-A	Group-B	
Position	Normal	20 (74.1)	14 (51.9)	0.091
	Shifted-high	07 (25.9)	13 (48.1)	
Shape	Normal	21 (77.8)	16 (59.3)	0.143
	Broadening	06 (22.2)	11(40.7)	
Mobility	Normal	08 (29.6)	09 (33.3)	0.770
	Painful	19 (70.4)	18 (66.7)	
Tenderness	Present	22 (81.5)	25 (92.6)	0.224
	Absent	05 (18.5)	02 (07.4)	
Patellar tap	Present	23 (85.2)	24 (88.9)	0.685
	Absent	04 (14.8)	03 (11.1)	

A Chi-square test was done to measure the level of significance. Figures within parentheses indicate the percentage.

Table-7: Distribution of patients according to VAS (n=54)

Treatment period	Group		*p*-value
	Group-A	Group-B	
Pre treatment	6.22 ± 1.60	7.15 ± 1.56	0.036
After 1 week	5.22 ± 1.58	5.30 ± 1.54	0.862
After 2 week	4.85 ± 1.70	3.92 ± 1.46	0.037
After 3 week	4.25 ± 1.70	3.29 ± 1.51	0.032
After 4 week	4.07 ± 1.66	2.48 ± 1.45	0.001
After 5 week	3.48 ± 1.78	1.92 ± 1.17	0.001
After 6 week	3.04 ± 1.72	1.33 ± 1.10	0.001

The study's 't-test was done to measure the level of significance.

Table-8: Distribution of patient according to ROM (n=54)

Treatment period	Group		*p*-value
	Group-A	Group-B	
Pre-treatment	117.33±13.05	112.37 ± 19.01	0.269
After 1 week	119.67±12.03	118.18 ± 12.92	0.665
After 2 week	121.66±11.29	122.03 ± 10.80	0.902
After 3 week	122.92±10.51	125.44 ± 8.96	0.348
After 4 week	124.81±9.62	128.29 ± 6.84	0.132
After 5 week	125.96±9.25	129.96 ± 5.48	0.059
After 6 week	127.29±8.60	131.67 ± 4.35	0.022

The study's' test was done to measure the level of significance.

Table-9: Distribution of patient according to the time taken to walk 50 feet (n=54)

Treatment period	Group		*p*-value
	Group-A	Group-B	
Pre treatment	18.22± 2.39	18.81 ± 2.13	0.341
After 1 week	17.18± 2.30	17.14 ± 2.10	0.951
After 2 week	16.81± 2.18	15.96 ± 1.81	0.125
After 3 week	16.40± 2.42	15.33 ± 1.90	0.076
After 4 week	15.96± 2.28	14.78 ± 2.02	0.049
After 5 week	15.40± 2.60	14.44 ± 1.86	0.125
After 6 week	15.07± 2.49	13.62 ± 2.04	0.024

The study's 't-test was done to measure the level of significance.

Table-10: Distribution of patients according to WOMAC index (n=54)

Treatment period	Group		*p*-value
	Group-A	Group-B	
Pre-treatment	60.85± 15.86	67.33 ± 16.33	0.145
After 1 week	53.96 ± 15.54	55.63 ± 14.91	0.689
After 2 week	47.74 ± 15.97	47.03 ± 15.21	0.869
After 3 week	41.18 ± 15.74	38.96 ± 14.49	0.592
After 4 week	35.89 ± 15.46	30.96 ± 13.74	0.222
After 5 week	30.89 ± 16.11	22.48 ± 11.58	0.032
After 6 week	25.29± 15.30	13.85 ± 9.62	0.002

The study's 't-test was done to measure the level of significance.

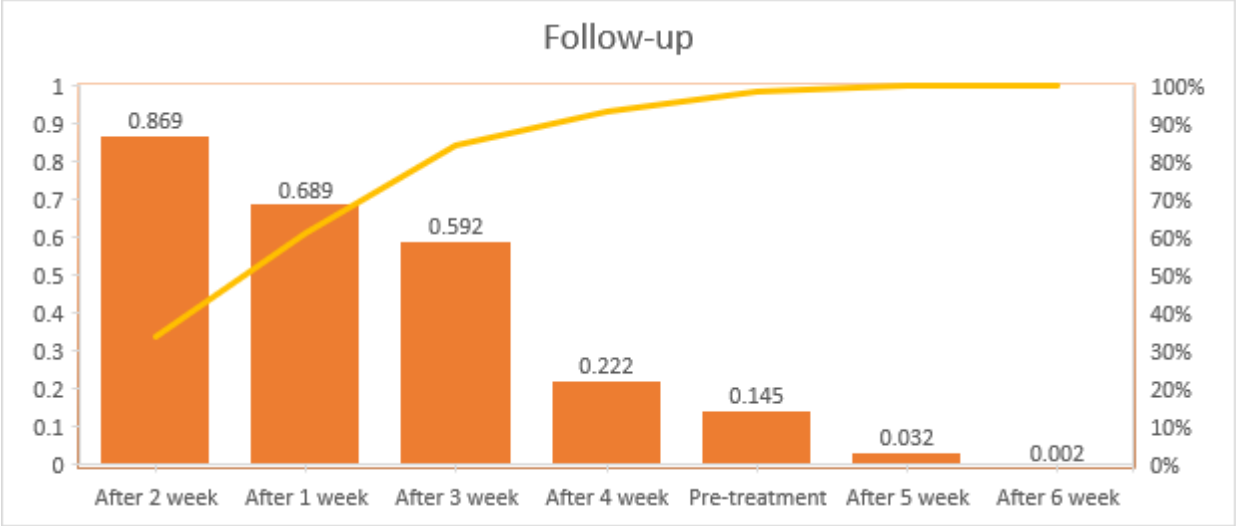

Fig-1: Treatment period statistically significant

Pretreatment group mean time to walk 50 feet A and group B were 18.22±2.39 and 18.81±2.13 minutes, respectively. Mean Western Ontario and Mc Master Universities (WOMAC) index in groups A and B were 60.85±15.86 and 33±16.33 minutes, respectively. Time is taken to walk 50 feet, and Western Ontario and McMaster Universities (WOMAC) score significantly dropped in both groups after treatment, which was statistically significant. ROM was gradually improved.

DISCUSSION

The purpose of this study was to assess the effects of a drug of long-acting intraarticular injection treatment in conjunction with physical modalities in patients with osteoarthritis (OA) knees and the functional improvement and clinical result of those injections. The study involved 54 people. Corticosteroid injections into the joint have been utilized in clinical practice for many years to relieve pain and reduce inflammation in OA. The American College of Rheumatology (ACR) recommends intraarticular corticosteroid injections for the treatment of knee OA [14].

An intraarticular corticosteroid injection can subside local inflammation with pain reduction, and it can also reduce the progression of structural changes [15] Godwin & Dawes [11]. According to a systematic review and meta-analysis, for osteoarthritic knee pain, intraarticular corticosteroid injection results in clinical and statistical significance within a week of injection. The treatment results were in line with those of prior trials by Ravaud *et al*. [16]; Friedman & Moore [17]. Dieppe *et al*. [18] and Gaffney *et al*. When low dose inherited condition was given to individuals with knee osteoarthritis, both clinical symptoms of joint effusion and effective synovial fluid suction were associated with an enhanced benefit from the injection [19].

Steroid injection was given to 70 individuals with primary knee osteoarthritis who met the American College of Rheumatology criteria. The injections were given at three-month intervals for two years. For the WOMAC pain subscale, nocturnal pain assessment, and range of mobility, patients injected with triamcinolone acetonide exhibited a trend toward greater improvement, notably at the first-year follow-up, compared to those who received injections of normal saline. Furthermore, Raynauld *et al*. [20] found that knee discomfort and stiffness were dramatically reduced over two years when triamcinolone acetonide injections were used instead of saline injections. A drawback of this study is that it was performed just in Dhaka, which may not indicate the entire country. As a result of the study's small sample size, there were certain limitations. Patients were only monitored for 6 weeks due to a time restriction.

CONCLUSION

However, despite better evidence that intraarticular treatment considerably improves the short-term result and much less so the development of osteoarthritis, corticosteroid injection remains one of the mainstays of the care of osteoarthritis, particularly osteoarthritis of the knee. There was a statistically significant difference in VAS, ROM, and the time it took to walk 50 feet between the groups in this research.

REFERENCES

1. Kramer, J. S., Yelin, E. H., & Epstein, W. V. (1983). Social and economic impacts of four musculoskeletal conditions. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology*, *26*(7), 901-907.
2. Altman, R., Asch, E., Bloch, D., Bole, G., Borenstein, D., Brandt, K., ... & Wolfe, F. (1986). Development of criteria for the classification and reporting of osteoarthritis: classification of

osteoarthritis of the knee. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology*, *29*(8), 1039-1049.

3. Hochberg, M. C., Lawrence, R. C., Everett, D. F., & Cornoni-Huntley, J. (1989, May). Epidemiologic associations of pain in osteoarthritis of the knee: data from the National Health and Nutrition Examination Survey and the National Health and Nutrition Examination-I Epidemiologic Follow-up Survey. In *Seminars in arthritis and rheumatism* (Vol. 18, No. 4 Suppl 2, pp. 4-9).
4. Sandell, L. J., & Aigner, T. (2001). Articular cartilage and changes in arthritis: cell biology of osteoarthritis. *Arthritis Research & Therapy*, *3*(2), 1-7.
5. Lozada, C. J., & Altman, R. D. (1997). Chondroprotection in osteoarthritis. *Bulletin on the rheumatic diseases*, *46*(7), 5-7.
6. Nieves-Plaza, M., Castro-Santana, L. E., Font, Y. M., Mayor, A. M., & Vilá, L. M. (2013). Association of hand or knee osteoarthritis with diabetes mellitus in a population of Hispanics from Puerto Rico. *Journal of clinical rheumatology: practical reports on rheumatic & musculoskeletal diseases*, *19*(1).
7. Brosseau, L., Yonge, K. A., Welch, V., Marchand, S., Judd, M., Wells, G. A., & Tugwell, P. (2003). Thermotherapy for treatment of osteoarthritis. *Cochrane Database of Systematic Reviews*, (4).
8. Hasan, Dr M. D.F., Mandal, Dr. M.A. (2017). Effect of Ultrasound Therapy on Patients With Osteoarthritis of The Knee Joint. Available from: https://japi.org/u2b4e4a4/osteoarthritis
9. Vardiman, J. P., Moodie, N., Siedlik, J. A., Kudrna, R. A., Graham, Z., & Gallagher, P. (2015). Short-wave diathermy pretreatment and inflammatory myokine response after high-intensity eccentric exercise. *Journal of athletic training*, *50*(6), 612-620.
10. Balch, H. W., Gibson, J. M. C., El-Ghobarey, A. F., Bain, L. S., & Lynch, M. P. (1977). Repeated corticosteroid injections into knee joints. *Rheumatology*, *16*(3), 137-140.
11. Godwin, M., & Dawes, M. (2004). Intra-articular steroid injections for painful knees. Systematic review with meta-analysis. *Canadian Family Physician*, *50*(2), 241-248.
12. Mahmud, M. R. (2021). Evaluation of the Outcome of Arthroscopic ACL Reconstruction by Quadrupled Hamstring Tendon Graft and Fixation with Biodegradable Screw in ACL Injury. *Sch J App Med Sci*, *7*, 1218-1229.
13. Haque, A. (2021). Outcomes and Evaluation of Patelloplasty using Delayed Absorbable Suture Materials of displaced Patella Fracture. *Saudi J Biomed Res*, *6*(6), 174-180.
14. Hochberg, M. C., Altman, R. D., Brandt, K. D., Clark, B. M., Dieppe, P. A., Griffin, M. R., ... & Schnitzer, T. J. (1995). Guidelines for the medical management of osteoarthritis. Part II. Osteoarthritis of the knee. American College of Rheumatology. *Arthritis and rheumatism*, *38*(11), 1541-1546.
15. Creamer, P. (1997). Intra-articular corticosteroid injections in osteoarthritis: do they work and if so, how?. *Annals of the rheumatic diseases*, *56*(11), 634-635.
16. Ravaud, P., Moulinier, L., Giraudeau, B., Ayral, X., Guerin, C., Noel, E., ... & Dougados, M. (1999). Effects of joint lavage and steroid injection in patients with osteoarthritis of the knee: results of a multicenter, randomized, controlled trial. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology*, *42*(3), 475-482.
17. Friedman, D. M., & Moore, M. E. (1980). The efficacy of intraarticular steroids in osteoarthritis: a double-blind study. *The Journal of rheumatology*, *7*(6), 850-856.
18. Dieppe, P., Cushnaghan, J., Jasani, M. K., McCrae, F., & Watt, I. (1993). A two-year, placebo-controlled trial of non-steroidal anti-inflammatory therapy in osteoarthritis of the knee joint. *Rheumatology*, *32*(7), 595-600.
19. Gaffney, K., Ledingham, J., & Perry, J. D. (1995). Intra-articular triamcinolone hexacetonide in knee osteoarthritis: factors influencing the clinical response. *Annals of the rheumatic diseases*, *54*(5), 379-381.
20. Raynauld, J. P., Buckland-Wright, C., Ward, R., Choquette, D., Haraoui, B., Martel-Pelletier, J., ... & Pelletier, J. P. (2003). Safety and efficacy of long-term intraarticular steroid injections in osteoarthritis of the knee: A randomized, double-blind, placebo-controlled trial. *Arthritis & Rheumatism*, *48*(2), 370-377.