Sarcouncil Journal of Medical Sciences

ISSN(Online): 2945-3526

Volume- 04| Issue- 11| 2025

Research Article

Received: 20-10-2025 | Accepted: 15-11-2025 | Published: 29-11-2025

Assessment of the Clinical Outcomes of the Role of MRI in Improving Health Outcomes of 90 Patients with Knee Joint Injuries

Dr. Haitham Swain Yaseen Alhadadi[1], Dr. Imad Gatea Beden[2], Dr. Alfarazdaq Emad Albadran[3] and Dr. Ali Qais Abdulkafi[4]

[1]M.B.Ch.B., C.A.B.M.S. \ (Radiology), Iraqi Ministry of Health, Basrah Health Directorate, Specialist Radiologist, Zubair General Hospital, Basrah, Iraq.

[2]M.B.Ch.B., C.A.B.M.S. \ (Diagnostic Radiology), Iraqi Ministry of Health, Basrah Health Directorate, Senior Speciality in Radiology, Al-Sayab Teaching Hospital, Basra, Iraq.

[3]M.B.Ch.B., C.A.B.M.S. \ (Radiology), Iraqi Ministry of Health, Basrah Health Directorate, Director of The Radiology Department, Al-Mwani Teaching Hospital, Basrah, Iraq.

[4]M.B.Ch.B., D.C.H. \ (Pediatrics), Iraqi Ministry of Health, Kirkuk Health Directorate, Director of The Technical Affairs Department, Kirkuk Teaching Hospital, Kirkuk, Iraq.

Abstract: Knee joint injuries are considered one of the most common diseases in the musculoskeletal system, accounting for a large percentage of injuries to people. Magnetic resonance imaging (MRI) has been a major achievement in knee examination since the 1970s. This paper was contributed to evaluate the findings of 90 patients' health who have knee joint injuries and undergone magnetic resonance imaging. A total of 90 patients with knee joint injuries were enrolled, and diagnostic and demographic data underwent MRI technique during a 12-month follow-up from 4 March 2024 to 8 March 2025 at different hospitals in Iraq. We determined pathological findings and the type of injuries in the patients which investigated under MRI diagnoses. We also assessed the accuracy of MRI examination into 90 patients with knee joint injuries. Our findings were enrolled clinical data of knee injuries into 90 patients who participated in this study. Joint effusion was the most common pathology of knee injuries, who prevalent in our data, which including 88.89% following by anterior cruciate ligament (ACL) tear, which was 46.67%, where 51.11% of patients have injury in the right knee, while 48.89% in the left knee. It also medial location presented as well as one with the greatest prevalence (37.78%), but the lateral meniscus lesions represented 25.56%, respectively. It evaluated the effectiveness of the MRI technique in the accuracy of patients' examination, which a sensitivity of 95.8%, specificity (92.1%), positive predictive value (96.6%), negative predictive value (91.3%), and overall accuracy (94.5%). MRI showed high clinical-radiological agreement and allowed to modify of the therapeutic behavior, confirming itself as a first-line method in the comprehensive evaluation of knee injuries.

Keywords: Magnetic resonance imaging; knee joint injuries; health outcomes; meniscus; and accuracy.

INTRODUCTION

The knee is a complex joint that can be affected by various pathologies of mechanical, rheumatic, infectious, tumor, or post-traumatic origin. Knee pain can be acute or chronic, localized, or diffuse, accompanied or not by other symptoms, blockage, instability, or swelling **{** Kyu, H. H. *et al*., 2018**;** Flandry, F., & Hommel, G. 2011**}**. It is a symptom with various etiologies, frequent, with a possible impact on the daily or professional life of patients **{** InformedHealth. org [Internet], 2006**}**. The knee joint is one of the strongest in the human body, playing an essential role from walking to maintaining the standing position **{** Haspl M. *et al*., 2005**}.** Musculoskeletal disorders are much represented reasons for consultation, and knee pathology ranks second among complaints in this field. The American Medical Association emphasizes that the MRI of the lower extremities, and in particular the knee, is important. **{** Nguyen, U. S. D. *et al*., 2011**}**

Osteoarthritis (knee, hip, or other localization) was in the 2nd position of musculoskeletal disorders, after low back pain **{** Bunt, C. W. *et al*., 2018**}.** The painful knee represents a source of significant functional disability, negatively impacting the patient's quality of life and reducing working capacity **{** Baker, P. *et al*., 2003**}.** Osteoarthritis (knee, hip, or other location) could limit daily living activities and contribute to a change of work; 27.4% had difficulty walking. Osteoarthritis was the musculoskeletal disorder contributing the most to the limitations of daily living activities: walking difficulties, including an average attributable fraction was 22%, carrying objects (8.6%, or recourse to the help of a relative, 9.2%), or to the help of a health professional was 11.8%. **{** Agaliotis, M. *et al*., 2014**}**

Magnetic Resonance Imaging, or MRI, is a relatively recent technique. Radiology and medical imaging are facing multiple challenges related to explosive technological developments, the ever-increasing role of medical imaging in patient care **{**Kim, I. J. *et al*., 2011**}**. These rapid advances in the imaging sector, in particular for

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

***Corresponding Author:** Dr. Haitham Swain Yaseen Alhadadi

DOI-https://doi.org/10.5281/zenodo.17764527

musculoskeletal disorders, are constantly modifying the diagnostic approach of general practitioners and playing a role on orientations and on the cost of health **{**Sharma, D. *et al*., 2020**}**. It is evaluated clinical findings of a cross-sectional study for 90 patients who suffer from knee joint injuries who underwent to magnetic resonance imaging (MRI).

PATIENTS & METHODS

The study was developed as a cross-sectional study, which allowed for to characterize of the clinical usefulness of magnetic resonance imaging (MRI) in the diagnosis of knee joint injuries without intervening in the variables of interest. The study population consisted of all 90 patients with only a diagnosis of knee joint injuries confirmed by magnetic resonance imaging at the Hospital located in different hospitals in Iraq during the period between March 2024 and March 2025. This study was aimed to analysis and assess the extent of MRI's role in the investigation of knee joint injuries diagnoses for 90 patients.

Based on inclusion and exclusion criteria, there were some parameters included which have each of the records of patients with a diagnosis of types of knee injuries confirmed by institutional magnetic resonance imaging, without distinction of sex; anterior Cruciate Ligament (ACL) Injuries; and only patients who were diagnosed with MRI. In contrast, we excluded all the following parameters for all patients, which have each of patient with imaging diagnoses obtained outside the hospitals; clinical records with incomplete information; previous knee surgery; pregnant women; patients who suffer from psychiatric disorders; and patients with pacemakers.

For data collection, a cross-sectional clinical-radiological record study was designed into 90 patients with only a diagnosis of knee joint injuries confirmed by magnetic resonance imaging. All MRI scans in all patients with knee injuries were done utilizing a Philips 3 Tesla machine in the Hospital located in different hospitals in Iraq during the period between March 2024 and March 2025 through which socio – demographic variables (age, sex, laterality), technical characteristics of the MRI study (type of equipment, image quality), as well as imaging findings (presence, location, and type of meniscal rupture) were extracted. Additionally, checklists for the quality of radiological reports and a log of therapeutic decisions were used to evaluate the impact of MRI on clinical decision-making. We also performed into patients to assess the accuracy of MRI in the diagnoses of knee injuries pathology, bone contusion sites, and anterior cruciate ligament (ACL) injuries. Furthermore, we had been a univariate analysis of risk factors related to severe knee injury. Data analysis was performed using descriptive statistics (frequencies, percentages, means, and standard deviations) and exploratory association tests (Chi-square, ANOVA, or t-test, as appropriate), using IBM SPSS Statistics v.24 software. A significance level of $p < 0.05$ was adopted.

RESULTS

The sample consisted of 90 patients with a diagnosis of knee joint injuries confirmed by magnetic resonance imaging, with an age ranged between of 10 and 50 years (range: 19-45 years). The age distribution showed a predominance in the group of 20-39 years, mainly in men, who represented 66.67%, with 44.44% of patients had almost a class having overweight, as well as 60 % were in the middle class of the population.

Table 1. Enroll pre-diagnostic parameters of 90 patients involved in our cross–sectional study.

Categories	Sub - categories	Frequency	Percentage, %
Age groups (years)			
	10 - 20	17	18.89%
	21 - 30	35	38.89%
	31 - 40	25	27.78%
	41 - 50	13	14.44%
Sex			
	Male	60	66.67%
	Female	30	33.33%
BMI, [kg/m²]			
	Underweight (<18.5)	4	4.44%
	Normal weight (18.5–24.9)	36	40%
	Overweight (25.0–29.9)	40	44.44%

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

	Obesity (≥30.0)	10	11.11%
ASA Class			
	I	60	66.67%
	II	27	30%
	III	3	3.33%
Socioeconomic status			
	Lower class	21	23.33%
	Middle class	54	60%
	Upper class	15	16.67%

In relation to the morphology of the lesions, joint effusion was the most common pathology of knee injuries, which including 88.89%, followed by anterior cruciate ligament (ACL) tear, which was 46.67%, where 51.11% had injury in the right knee, while 48.89% in the left knee. The medial location was the one with the highest prevalence (37.78%), while the lateral meniscus lesions represented 25.56%, respectively. When analyzing the presence of osteo-degenerative changes, they were identified in 15% of the patients, being more frequent in older ages.

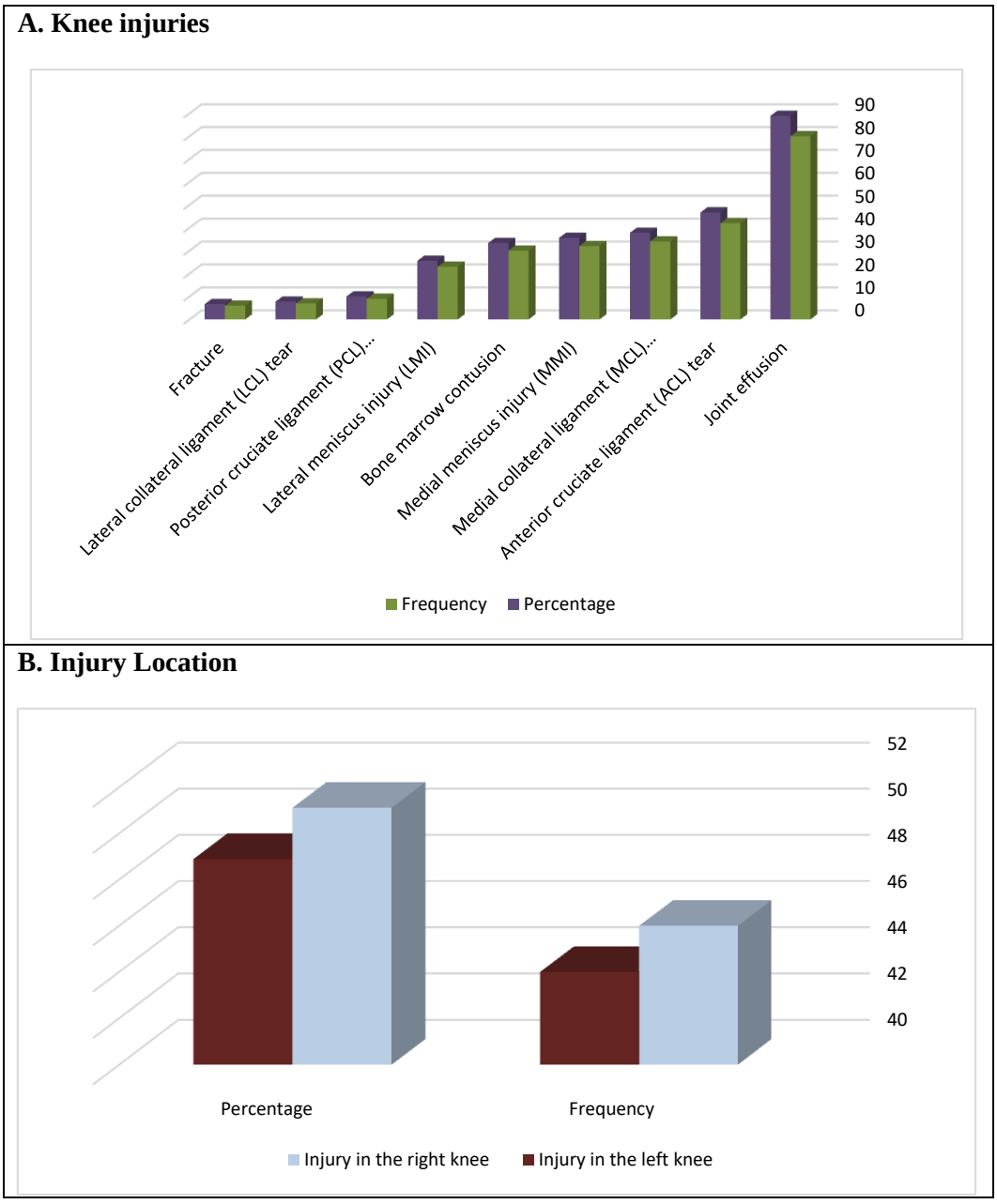


Figure 1. Identify knee injuries who diagnosed by MRI examinations.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

We also found that bone marrow contusion got 30%, where medial meniscus injury (MMI) with 37.78%, lateral meniscus injury (LMI) with 25.56%, and 22.22% of patients with osteoarthritis.

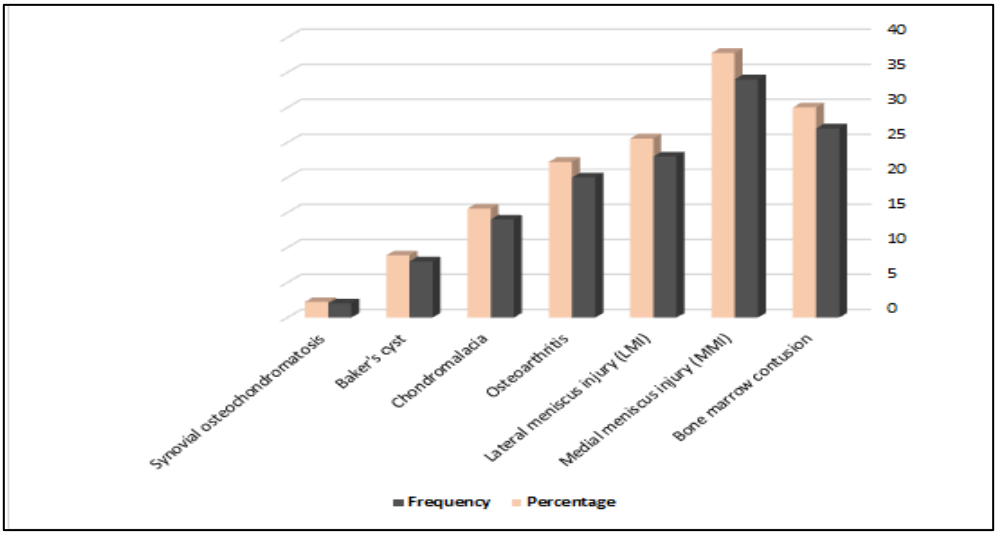


Figure 2. Distribution of knee injuries pathology diagnosed by MRI in patients.

Moreover, the current findings of ACL showed that 46.67% of the total 90 samples, where 12.22% got partial tear, but 33.33% examined with complete tear, where only 41 patients of ACL had joint effusion, where severe grade involved 23 cases. In addition, the femur was the most prevalent site of bone, which have 86.67% of total patients.

Table 2. Determining injuries of the anterior cruciate ligament (ACL) who examined through MRI.

Parameters	**Frequency, 90**	**Percentage, %**
ACL Involvement		
Normal ACL	48	53.33%
ACL Injury (Total)	42	46.67%
Type of ACL Tear (n=41)		
Partial Tear	11	12.22%
Complete Tear	30	33.33%
Joint Effusion in Patients with ACL Injury (n=41)		
Severe joint effusion	23	25.56%
Mild joint effusion	14	15.56%
Small joint effusion	4	4.44%
Normal	0	0%

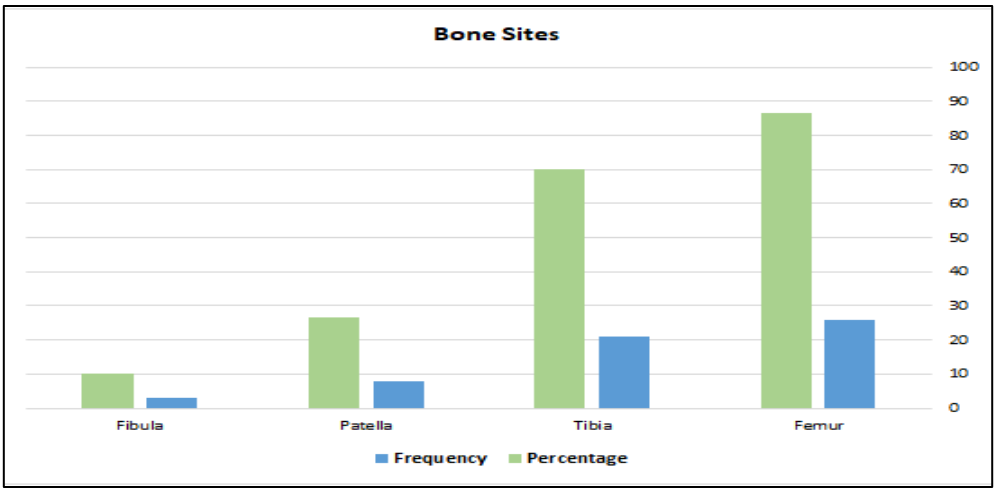


Figure 3. Enroll data of bone contusion location who diagnosed by MRI.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

In the assessment of MRI technique accuracy, all 90 samples were diagnoses of their knee injuries by MRI, where the sensitivity with 95.8%, the specificity with 92.1%, the positive predictive value was 96.6%, the negative predictive value was 91.3%, and the overall accuracy was 94.5%.

In terms of univariate analysis, age was common as a common risk factor enrolled in our study, who had scoring Or CI 95% with 1.44 (0.60 – 4.45), and males as the most common class who were injured with the knee joint, who including 2.11 (0.80 – 6.24).

Table 3. Evaluation the accuracy of the MRI technique in the diagnoses of knee injuries.

Items	Accuracy, %
Sensitivity	95.8%
Specificity	92.1%
Positive Predictive Value (PPV)	96.6%
Negative Predictive Value (NPV)	91.3%
Overall Accuracy	94.5%

Table 4. A performing of univariate analysis for risk factors related to knee injury on patients.

Risk Factor	Odds Ratio (OR)	95% (CI)	p-value
Age > 30 years	1.44	0.60 – 4.45	0.40
Male Sex	2.11	0.80 – 6.24	0.14
BMI ≥ 30 (Obesity)	3.84	1.12 – 11.84	0.02
History of Sports Injury	4.53	1.90 – 11.62	0.02
High-Energy Trauma Mechanism	5.24	2.03 – 10.22	0.02

Table 5. Identifying a correlation factor among an accuracy of MRI and health outcomes in patients.

Outcomes	Pearson's r correlation	p-value
Improvement in Lysholm knee score	0.76	<0.002
Reduction in the Vas pain score	0.73	<0.002
Patient satisfaction (0-10 scale)	0.66	<0.002
Rate of unplanned second interventions	-0.70	<0.002

DISCUSSION

Because MRI can detect a wide range of conditions, from meniscal injuries and ligament tears to bone marrow abnormalities, as well as cartilage degradation, it is a crucial diagnostic method for both acute and chronic knee pain. When developing treatment plans and monitoring the efficacy of therapeutic regimens, MRI's precise and prompt diagnosis is crucial.

Joint effusion became the most prevalent observation in 80 (88.89%) in the participants in this research. Similar to the current study, other research found that the most frequent MRI finding in individuals with knee discomfort was joint effusion, which was followed by meniscus and ACL injuries. The study's participants ranged in age from 10 to 50 years, and most of them were men (n=60, 66.67%). Similar to the current investigation, a German study **{** McNally, E. G. *et al*., 2002**}** of 174 persons between the ages of 18 and 45 who had experienced recent knee damage (less than six months) and were presenting for MRI revealed that the majority of study participants (71%) were male. **{** Davies A. M. *et al*., 1992**}**

42 (46.67%) in the patients in our study had an injury to the ACL. Only thirty of them had a complete tear, whereas 11 had a partial tear. However, in the current study, all nine (10.00%) of the participants having PCL injury had full tears. Sixty-seven percent of the patients in a French investigation **{** Araki, Y. *et al*., 1994**}** had partial ACL damage. Additionally, almost all of the cases were acute, indicating that tears were the most common ACL pathology.

In a Spanish research study **{** Dreizen, P. 2004**},** 50 patients with symptoms of knee discomfort and instability were chosen to be examined using the three techniques. It was found that the diagnosis of isolated ACL and PCL injuries is almost identical whether determined by clinical examination, MRI, and arthroscopy. In physical examination, the sensitivity and specificity for meniscal lesions were 88% and 87%, respectively, whereas in MRI, they were 93.5% and 93%.

In this study, the specificity, positive, and negative predictive values were more favorable for clinical examination, although MRI was more sensitive for knee joint injuries. The use of MRI as a

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

supplementary tool in the management of meniscus and knee joint injuries should be highly individualized **{** Chien, A. *et al*., 2020**;** Bansal, N. *et al*., 2018**}.** In another study on a total of 83 knees, the MRI results were compared with the findings in MRI, where it was shown that MRI has a moderate sensitivity of 69.7 to 88.2%, a specificity of 73.4 to 93% and an accuracy of 74.6 to 91.5% to detect and classify chondral lesions. **{**Hetta, W., & Niazi, G. 2014**}**

In the present study, 55 (61.11%) participants had meniscus injury; of these, 32 (35.56%) subjects had medial and 23 (25.56%) had lateral meniscus injury. With regards to lateral meniscus injury, the majority, 42 (46.67%), had an injury in the anterior horn, followed by 9 (10%) having an injury in the posterior horn.

With strong sensitivity as well as specificity in both medial along with lateral tears, they confirmed whether MRI is a trustworthy diagnostic method for meniscal tears. These MRI results show that establishing effective therapies requires significant diagnostic precision for recognizing meniscal tears **{** Yadav, R., & Kachewar, S. G. 2014**}.** In a study conducted in Italy **{** Rana, S. *et al*., 2021**},** 49% of the patients had medial meniscal lesions, but 16% had lateral meniscal lesions. Baker's cyst was the most often found cyst among the 14 (12.5%) patients with cystic lesions in the current investigation. The most common cystic lesion, as reported by, was a popliteal cyst, which has been associated with meniscal tears and effusions. **{** Woolson, R. F. *et al*., 1986**;** Fisher, R. A. 1922**;** van Oudenaarde, K. *et al*., 2017**}**

MRI is more accurate than physical examination and X-rays to detect chondral lesions, so it is an important tool to evaluate the symptomatic knee. The clinical diagnosis has an accuracy of 80% according to historical research **{** Mattoo, P. *et al*., 2021**;** Wang, W. *et al*., 2021**}.** Similar to our findings, combined lesions had the specificity was 92.1% and the sensitivity of 95.8% by 93% in MRI.

CONCLUSION

The findings of this study confirm that magnetic resonance imaging constitutes a highly reliable diagnostic resource for the identification of knee joint injuries, as it allows a precise characterization of their morphology and location, which an ability strengthens the clinical-radiological agreement and evidence that MRI not only describes the injury, but decisively guides the most relevant therapeutic strategy, as well as it is shown that MRI contributes to optimizing the selection of patients who are candidates for surgery and to reducing unnecessary interventions, which consolidates it as a key tool in the comprehensive care of knee joint injuries pathology.

REFERENCES

1. Kyu, H. H., Abate, D., Abate, K. H., Abay, S. M., Abbafati, C., Abbasi, N., ... & Breitborde, N. J. "Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017." *The Lancet* 392.10159 (2018): 1859-1922.
2. Flandry, F., & Hommel, G. "Normal anatomy and biomechanics of the knee." *Sports medicine and arthroscopy review* 19.2 (2011): 82-92.
3. InformedHealth. org [Internet]. "Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG)." *Depression: What Is Burnout?* (2006).
4. Haspl M, Jelić M, Smoljanović T. "Emergencies in the knee joint surgery (in Croatian)." https://pubmed.ncbi.nlm.nih.gov/16485835/ Lijec Vjesn.;127 (2005) :193–196.
5. Nguyen, U. S. D., Zhang, Y., Zhu, Y., Niu, J., Zhang, B., & Felson, D. T. "Increasing prevalence of knee pain and symptomatic knee osteoarthritis: survey and cohort data." *Annals of internal medicine* 155.11 (2011): 725-732.
6. Bunt, C. W., Jonas, C. E., & Chang, J. G. "Knee pain in adults and adolescents: the initial evaluation." *American family physician* 98.9 (2018): 576-585.
7. Baker, P., Reading, I., Cooper, C., & Coggon, D. "Knee disorders in the general population and their relation to occupation." *Occupational and environmental medicine* 60.10 (2003): 794-797.
8. Agaliotis, M., Mackey, M. G., Jan, S., & Fransen, M. "Burden of reduced work productivity among people with chronic knee pain: a systematic review." *Occupational and environmental medicine* 71.9 (2014): 651-659.
9. Kim, I. J., Kim, H. A., Seo, Y. I., Jung, Y. O., Song, Y. W., Jeong, J. Y., & Kim, D. H. "Prevalence of knee pain and its influence on quality of life and physical function in the Korean elderly population: a community based

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher

cross-sectional study." *Journal of Korean medical science* 26.9 (2011): 1140.
10. Sharma, D., Sharma, A., Talwar, N., Mittal, P., Garg, S., & Airon, D. "Role of MRI evaluation in knee injuries." (2020).
11. McNally, E. G. "Magnetic resonance imaging of the knee: Is accurate and helps in making therapeutic decisions." *BMJ* 325.7356 (2002): 115-116.
12. Davies A. M., Wellings R. M "Imaging of bone tumors.". 4 (1992): 32–38.
13. Araki, Y., Tanaka, H., Yamamoto, H., Yamamoto, T., Shino, K., Nakamura, H., & Tsukaguchi, I. "MR imaging of pigmented villonodular synovitis of the knee." *Radiation medicine* 12.1 (1994): 11-15.
14. Dreizen, P. "The Nobel prize for MRI: a wonderful discovery and a sad controversy." *The Lancet* 363.9402 (2004): 78.
15. Chien, A., Weaver, J. S., Kinne, E., & Omar, I. "Magnetic resonance imaging of the knee." *Polish journal of radiology* 85.1 (2020): 509-531.
16. Bansal, N., Kaur, N., & Sandhu, K. S. "Role of MRI in the evaluation of painful knee joint." *Int J Anat Radiol Surg* 7 (2018): 0-30.
17. Hetta, W., & Niazi, G. "MRI in assessment of sports related knee injuries." *The Egyptian Journal of Radiology and Nuclear Medicine* 45.4 (2014): 1153-1161.
18. Yadav, R., & Kachewar, S. G. "Role of MRI in evaluation of painful knee." *International Journal of Medical Research & Health Sciences* 3.1 (2014): 84-87.
19. Rana, S., Hossen, M., Islamn, A., Shah, S., & Jalali, M. A. "Interpretation of the common MRI findings in patients with painful knee joint." *Eur. J. Med. Health Sci* 3.1 (2021): 19-26.
20. Woolson, R. F., Bean, J. A., & Rojas, P. B. "Sample size for case-control studies using Cochran's statistic." *Biometrics* (1986): 927-932.
21. Fisher, R. A. "On the interpretation of χ 2 from contingency tables, and the calculation of P." *Journal of the royal statistical society* 85.1 (1922): 87-94.
22. van Oudenaarde, K., Swart, N. M., Bloem, J. L., Bierma-Zeinstra, S. M., Algra, P. R., Koes, B., ... & Reijnierse, M. "Post-traumatic knee MRI findings and associations with patient, trauma, and clinical characteristics: a subgroup analysis in primary care in the Netherlands." *British Journal of General Practice* 67.665 (2017): e851-e858.
23. Mattoo, P., RuzinaFirdose, S., & Singh, P. "Evaluation of non-traumatic painful knee on MRI." *Inter J Dent Med Sci Res* 3 (2021): 1554-62.
24. Wang, W., Li, Z., Peng, H. M., Bian, Y. Y., Li, Y., Qian, W. W., ... & Lin, J. "Accuracy of MRI diagnosis of meniscal tears of the knee: a meta-analysis and systematic review." *The Journal of Knee Surgery* 34.02 (2021): 121-129.

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:
Alhadadi, H. S. Y., Beden, I. G., Albadran, A. E. & Abdulkafi, A. Q. "Assessment of the Clinical Outcomes of the Role of MRI in Improving Health Outcomes of 90 Patients with Knee Joint Injuries." *Sarcouncil journal of Medical sciences* 4.11 (2025): pp 16-22.

Copyright © 2022 The Author(s): This work is licensed under a Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International License

Publisher: SARC Publisher