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Research Article

Bibliometric Analysis of the Publications of Malaysian Orthopaedic Journal (2015-2024)

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ABSTRACT

Background and Aim: This study aimed to characterise the orthopaedic research landscape within the Malaysian Orthopaedic Journal (MOJ) from 2015 to 2024 through a comprehensive bibliometric analysis. Understanding publication trends, thematic foci, and collaborative networks is crucial for assessing a regional journal's contribution to global orthopaedic knowledge and identifying research priorities. **Methodology:** All orthopaedic publications focusing on Malaysia and foreign countries indexed in the Scopus database and covered in the MOJ from 2015 to 2024 were analysed. A comprehensive search strategy yielded 539 global documents. Information such as author and institution details, funding, collaboration, citations, and publication type/source was identified, downloaded, and analysed using MS-Excel and VOSviewer. Key indicators included publication trends, document types, funding, geographical distribution, subject areas, and author/organisation productivity. **Results:** The MOJ published 539 articles, demonstrating significant growth from 2015 to 2020, with a global annual publication growth rate of 118.98%. Foreign contributions (357 articles) outnumbered Malaysian (193 articles), with foreign papers showing slightly higher citation impact (4.52 CPP vs. 3.52 CPP). Research articles were predominant (89.24%), while reviews had the highest citation impact (25.17 CPP). Only 3.34% of documents reported external funding. "Trauma, Fracture and Dislocation" was the most dominant subject (35.44%), and the knee was the most studied anatomical region. Asian countries were the most prolific contributors, though European and African countries showed higher citation impacts per paper. Universiti Malaya and Universiti Sains Malaysia were the top productive organisations, and R.Y. Kow was a leading author. **Conclusion:** The MOJ has experienced substantial growth, serving as a significant platform for orthopaedic research with a strong international presence. The research primarily addresses prevalent musculoskeletal conditions, particularly trauma. While the journal effectively disseminates knowledge, there is a notably low proportion of externally funded research, suggesting an area for future development.

Keywords: Orthopedics, Bibliometrics, Malaysia, Research, Publication Trends, Citation Analysis.

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INTRODUCTION

Orthopaedics is a specialised branch of medicine focusing on the Musculoskeletal (MSK) system, and plays a crucial role in maintaining human mobility and quality of life. The field encompasses a vast array of conditions, from traumatic injuries and degenerative diseases to congenital deformities and infections, necessitating continuous research and innovation to improve patient outcomes (Blyth *et al.*, 2019). As the global burden of MSK disorders continues to rise, driven by an ageing population and lifestyle changes, the importance of robust orthopaedic research becomes increasingly evident (GBD, 2017 and Cross *et al.*, 2014).

Bibliometric analysis offers a powerful methodology to systematically evaluate the scientific output of a specific field, journal, or region. By quantifying and analysing publications, citations, collaborations, and thematic trends, bibliometrics provides valuable insights into the intellectual landscape, emerging areas of interest, and the impact of research (Ellegaard and Wallin, 2015, and Donthu *et al.*, 2021). Such analyses are instrumental for researchers, policymakers, and funding bodies to identify strengths, weaknesses, and opportunities within a scientific domain, guiding future research directions and resource allocation (Zupic and Carter, 2014).

The Malaysian Orthopaedic Journal (MOJ) is an official journal of the Malaysian Orthopaedic Association (*https://www.morthoj.org/*). It is indexed in major databases like Scopus, Web of Science (ESCI), and PubMed/PubMed Central, ensuring wide discoverability. With a Journal Impact Factor of 0.6 and a CiteScore of 1.2 in 2024, the MOJ demonstrates its growing influence and commitment to disseminating high-quality

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Orthopaedic and trauma research from Asia. Understanding the research landscape reflected in its publications is vital for assessing its contribution to global orthopaedic knowledge and identifying regional research priorities. While general bibliometric studies exist for broader medical fields or global orthopaedics (Paleti *et al*., 2025, and Alomar *et al*., 2024), a focused analysis on a specific regional journal like the MOJ provides a nuanced perspective on local and international collaborations, prevalent research topics, and the impact of publications over time.

This study aims to conduct a comprehensive bibliometric analysis of publications indexed in the MOJ from 2015 to 2024. By examining publication trends, document types, funding patterns, geographical distribution of authors, and thematic areas, this research seeks to characterise the orthopaedic research landscape within and beyond Malaysia as represented in the MOJ. Furthermore, the study will identify highly cited papers, most productive organisations, and key authors, shedding light on influential contributions and collaborative networks within this specific journal's scope. The findings will contribute to a better understanding of orthopaedic research dynamics, highlight areas of growth, and inform future strategies for advancing musculoskeletal health research.

METHODOLOGY

All orthopaedic publications focusing on Malaysia and foreign countries indexed in the Scopus database and covered in the MOJ, covering 10 years from 2015 to 2024, are analysed through the development of a comprehensive search strategy on 15.07.2025. The search strategy was developed and executed using the journal source tag and restricting the publication years to 2015-2024, which initially yielded 539 documents. The following search strategy was used:

From the 539 publications of MOJ, information such as author and institution details, funding, collaboration, citations, and publication type/source was identified and downloaded for each record, and later all records were analysed using MS-Excel and VOSviewer *(https://www.vosviewer.com/).* The bibliometric analysis focused on several key indicators: assessing overall publication trends and growth, characterising publication types and sources. Additionally, the study classified papers by broad subject areas, keywords, and organ/bone focus, and identified the top 10 countries, 20 most productive organisations (with ≥5 papers), the top 19 most productive authors (with ≥5 papers), and highly cited papers or HCPs (with ≥50 citations).

The studies with at least one author from Malaysia are referred to as Malaysian studies. The studies having at least one of the authors not from Malaysia are referred to as foreign studies.

RESULTS

Publications

Annual and Cumulative Growth

The journal MOJ published a total of 539 articles over 10 years (average 53.9 papers per year), experiencing substantial growth in global publications from 2015 to a peak in 2020, followed by a decline through 2024 (Figure 1) with an overall annual growth rate of 118.98%.

Of these, 193 articles originated from Malaysia and 357 from foreign countries; both categories showed similar growth and decline patterns, with foreign publications having a higher annual average growth rate (80.63%) compared to Malaysian publications. Globally, the journal's articles received 2214 citations, averaging 4.11 Citations per Paper (CPP), with foreign articles receiving more citations per paper (4.52) than Malaysian articles (3.52) (Table 1).

Type of Documents

The research articles were the predominant document type, accounting for 481 publications (89.24%), followed by letters (7.24% share), notes and reviews (1.11% share each), editorials (0.74% share) and errata (0.56% share). The reviews registered the highest citation impact (25.17 CPP), followed by editorials (4.50 CPP), articles (4.22 CPP), letters (0.33 CPP), and notes (0.17 CPP) (Annexure 1).

Funded Research

Out of 539 documents published in the MOR, a mere 18 (3.34%) received external funding support, collectively garnering 98 citations with an average of 5.44 citations per paper. Leading funding agencies among 21 participating agencies included the Universiti Sains Malaysia, supporting 3 papers, followed by Chulalongkorn University, Faculty of Medicine, Jeju National University, and University of Southern Maine (2 papers each), etc.

Type of Studies and Population Age Groups

In publications covered by MOJ, studies predominantly focused on adults, comprising 51.76% of papers, followed by children and adolescents (19.11%), the aged (18.92%), and the middle-aged (10.2%). Clinical studies were the most common type of research, making up 60.85% of papers (328 papers). Other significant study types included outcome assessment (11.69%, 63 papers), risk factors (6.68%, 36 papers), epidemiology (6.12%, 33 papers), complications (5.94%, 32 papers), quality of life (4.82%, 26 papers), and treatment outcome (3.8%, 21 papers).

Regarding research design, case-reports were the most frequent (30.43%, 164 papers), with retrospective studies (21.34%, 115 papers), controlled studies (14.66%, 79 papers), prospective studies (11.69%, 63 papers), cross-sectional studies (6.49%, 35 papers), observational studies (5.38%, 29 papers), and

comparative studies (4.8%, 26 papers) also commonly used. For laboratory research techniques, NMR imaging was the most utilized (18.92%, 102 papers), followed by computer-assisted tomography (17.07%, 92 papers), radiography (5.35%, 45 papers), bone radiography (5.35%, 45 papers), fluoroscopy (3.71%, 20 papers), and ecography (3.15%, 17 papers).

Author's Geographical Distribution

Authors from 43 countries contributed to the MOJ, with Asian countries leading by a significant margin. Twenty Asian countries collectively submitted 493 papers, representing a 91.46% share of all contributions. This was followed by 15 European countries (57 papers; 10.57%), 5 African countries (6 papers; 1.11%), 1 Ocean and Pacific country (6 papers; 1.11%), and 1 North American country (5 papers; 0.93%). Among Asian contributors, Malaysia was the top contributor with 193 papers, followed by India (130 papers), Singapore (54 papers), Indonesia (25 papers), Thailand (17 papers), Turkey (15 papers), and the Philippines (11 papers). Within Europe, the UK was the highest contributor with 25 papers, then Italy (14 papers), Portugal (4 papers), and France (3 papers).

Despite Asia's high volume of publications, Africa demonstrated the highest average CPP at 13.67, even with only 6 papers and 82 citations. European countries also showed a strong citation impact with an average of 6.12 CPP from their 57 papers. North America (specifically the United States, with 5 papers) and Ocean and Pacific countries (Australia, with 6 papers) had medium citation values of 5.0 CPP and 4.75 CPP, respectively. Asian countries, despite their substantial publication output, recorded the lowest average CPP at 3.80.

Profile of Top 15 Countries

The top 10 countries individually contributed 10 to 193 papers and together contributed 494 papers and 2007 citations, accounting for 91.65% and 90.65% share respectively, each in total papers and citations. Among top 10 countries: (i) Three countries contributed more than the average productivity (53.9): Malaysia (193 papers), India (130 papers) and Singapore (54 papers) and (ii) Four countries registered citation impact (measured by CPP and Relative Citation Index or RCI), more than their average (4.06 and 0.99): United Kingdom (UK) (8.64 and 2.10), Thailand (6.24 and 1.52), Indonesia (5.84 and 1.421) and Italy (5.71 and 1.39) (Table 2).

Co-authorship Network Analysis of the Top 20 Countries

Among the 40 countries contributing to this dataset, 20 met the minimum threshold of three publications and were selected for detailed co-authorship analysis. The visualisation map (Figure 2), generated using VOSviewer with attraction and repulsion parameters set at 6 and -2, respectively, reveals a collaborative network divided into 11 clusters. Clusters 1 to 3 comprise three countries each, clusters 4 to 6 contain two countries each, while clusters 7 to 11 consist of a single country each. Overall, the map presents 15 collaborative links with a total link strength (TLS) of 27. The collaboration matrix shows that India demonstrates the strongest international linkages, most notably with the UK (4 links), followed by bilateral collaborations with Malaysia, Australia, and Thailand (2 links each). Malaysia also exhibits significant collaborative ties, partnering with the United Kingdom (3 links), Singapore (2 links), and the United States (2 links).

Additionally, Indonesia maintains robust collaboration with South Korea (3 links). Several other countries are connected through single-link collaborations, contributing to a cumulative TLS of 19. These findings highlight the dominance of India and Malaysia as central nodes in the co-authorship network, reflecting their pivotal roles in facilitating cross-border research collaborations.

Distribution of Papers

Subject-Wise

"Trauma, Fracture and Dislocation" was the most dominant subject, accounting for 191 (35.44% share), followed by "Pediatric trauma and orthopedics" (80 papers and 14.84% share), "Infection and Covid-19" (70 papers and 12.99% share), "Arthroplasty" (57 papers and 10.58% share), "Spine/spinal surgery"(64 papers and 11.87% share), "Arthroscopy and sport injury" (36 papers and 6.68% share), "Metabolic diseases" (25 papers and 4.64% share), "Cancer and tumor" (22 papers and 4.08% share) and

Annexure 1: Type of Documents published in the Malaysian Orthopaedic Journal (2015-2024).

Sl. No.	Document Type	TP	TC	CPP	Percentage
1	Articles	481	2031	4.22	89.24
2	Letters	39	13	0.33	7.24
3	Notes	6	1	0.17	1.11
4	Reviews	6	151	25.17	1.11
5	Editorials	4	18	4.50	0.74
6	Erratum	3	0	0.00	0.56
		539	2214	4.11	100.00

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

Table 1: Annual Growth of Literature in the Malaysian Orthopaedic Journal (2015-2024).

Total publications				Malaysian publications			Foreign countries publications		
Year	TP	TC	CPP	TP	TC	CPP	TP	TC	CPP
2015	4	36	9.00	1	0	0.00	4	36	9.00
2016	45	344	7.64	14	103	7.36	31	241	7.77
2017	53	373	7.04	26	156	6.00	29	239	8.24
2018	44	276	6.27	15	81	5.40	30	204	6.80
2019	44	389	8.84	15	72	4.80	29	317	10.93
2020	85	367	4.32	30	134	4.47	56	266	4.75
2021	84	210	2.50	33	58	1.76	53	157	2.96
2022	74	125	1.69	27	45	1.67	48	84	1.75
2023	56	79	1.41	19	28	1.47	39	55	1.41
2024	50	15	0.30	13	2	0.15	38	13	0.34
	539	2214	4.11	193	679	3.52	357	1612	4.52
2015-19	190	1418	7.46	71	412	5.80	123	1037	8.43
2020-24	349	796	2.28	122	267	2.19	234	575	2.46
	539	2214	4.11	193	679	3.52	357	1612	4.52

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

"Regenerative Medicine"(1 paper and 0.19% share). Among these broad subject areas "Infection and Covid-19" registered the highest citation impact (4.94 CPP), "Arthroplasty and joint replacement" (4.56 CPP), "Trauma, Fracture and Dislocation" (4.23 CPP), "Metabolic Diseases" (3.76 CPP), "Pediatrics trauma and orthopedics" (3.55 CPP), etc., (Annexure 2).

Keyword subject analysis

Keyword subject analysis revealed that "Osteosynthesis" is the most frequently occurring keyword, appearing in 46 papers. This is closely followed by "Bone Mass" (39 papers), "Surgical Technique" (37 papers), "Osteoarthritis" (36 papers), "Debridement"(36 papers), "Antibiotic Agents" (35 papers), "Fracture Healing"(34 papers), "Fraction Nonunion" (33 papers), "Weight Bearing"(31 papers), Traffic Accidents"(29 papers), "Bone Graft" (29 papers", "Intramedullary Nailing" (27 papers). "Fracture" (27 papers), "Plate Fixation" (24 papers), "Osteolysis" (24 papers". "Coronovirus Disease 2019" (24 papers), "Fracture Fixation" (23 papers), "Oseomyelitis" (22 papers), "Bone Transplantation" (22 papers), "C. Reactive Protein" (21 papers), " Arthroscopy" (21 papers), "Arthroplasty"(21 papers), etc.

Region-Wise/Bone-Wise

The Knee was the most frequently studied region, accounting for 99 TPs, representing 18.37% share of all papers, followed by Hip (78 papers and 14.47% share), Shoulder (55 papers and 10.2% share), Ankle (42 papers and 7.79% share), Elbow (37 papers and Neck (32 papers and 5.94% share), Head (24 papers and 4.45% share), etc.. All the orthopaedic regions witnessed growth in publications (except Skull) from 2007-5 to 2016-2024: Knee (from 21 to 78), Hip (from 22 to 56), Shoulder (from 16 to 39), etc., (Annexure 3).

Subfields

Among the orthopaedic regions subfield, Total Knee Arthroplasty (with 27 papers) contributed the largest number of papers, followed by Hip fracture (21 papers), disability of the arm, shoulder and hand (19 papers), hip arthroplasty (18 papers), etc., (Annexure 4).

Bone-Wise

The Femur bone was the most frequently studied, accounting for 100 TPs, representing 18.55% share of all papers, followed by Tibia/Tibial (60 papers and 11,13% share), Radius/Radial (30 papers and 5.57% share), Humerus/Humeral (19 papers and 3.53% share), Pelvic/Pelvis (18 papers and 3.34% share), etc.

Scapula (9.0 CPP), Tibia/Tibial (5.87 CPP) and Patellar (5.43 CPP) registered the highest citation impact, as against Acetabulum (1.64 CPP), Fibula (2.13 CPP) and Clavicle (2.23 CPP) registering the least citation impact (Annexure 5).

Subfields

Among the bone subfields, Tibia Fracture contributed the maximum papers (20), followed by Femur Fracture (18 papers), Femoral Neck Fracture (16 papers), Femur Intertrochanteric Fracture and Distal Radius Fracture (11 papers each), Humeral Supercondylar Fracture and Pelvis Fracture (7 papers each), Proximal Femur Fracture and Femur Trochanteric Fracture (6 papers each) Femur Subtrochanteric Fracture, Femur Shaft

Fracture, Radius Fracture, Distal Humeral Fracture (5 papers each), Distal Femur Fracture (4 papers), etc.

Most Productive Organisations

A total of 161 organisations contributed to research in the MOJ from 2015 to 2024, of which 41 organisations published 1 paper each, 61 organisations 2 papers each, 27 organisations 3 papers each, 17 organisations 4-5 papers each, 6 organisations 6-10 papers each, and 9 organisations 11-41 papers each. The top 20 organisations individually contributed 5 to 41 papers and collectively produced 263 papers and garnered 944 citations, accounting for a significant 48.79% of TP and 42.64% of TC, with an average productivity of 13.15 papers per organisation.

Among these, five organisations surpassed the average productivity, led by Universiti Malaysia (41 papers), Universiti Sains Malaysia (37 papers), Universiti Kebangsaan Malaysia (32 papers), Tan Tock Seng Hospital, Singapore (24 papers), and International Islamic University, Malaysia (15 papers each). In terms of citation impact, 9 organisations registered a CPP higher than the overall average (3.59 and 0.87), with University of

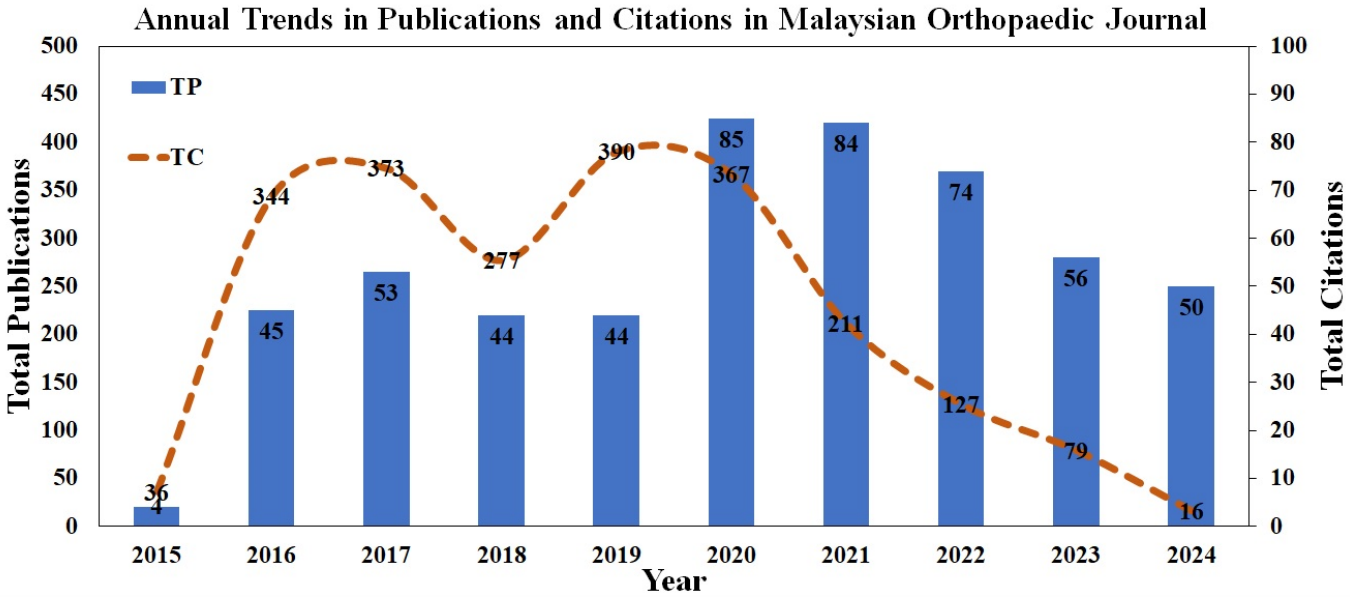

Figure 1: Year-wise Publications and Citations Trends in the Malaysian Orthopaedic Journal (2015-2024).

Table 2: Contribution of the Top 10 Productive Countries in the Malaysian Orthopaedic Journal.

Sl. No.	Country	TP	TC	CPP	RCI	TLS	TP	
							2015-19	2020-24
1	Malaysia	193	679	3.52	0.86	13	71	122
2	India	130	491	3.78	0.92	15	46	84
3	Singapore	54	197	3.65	0.89	5	12	42
4	Indonesia	25	146	5.84	1.42	4	9	16
5	United Kingdom	25	216	8.64	2.10	7	11	14
6	Thailand	17	106	6.24	1.52	2	7	10
7	Turkey	15	37	2.47	0.60	1	6	9
8	Italy	14	80	5.71	1.39	1	5	9
9	Philippines	11	26	2.36	0.58	0	0	11
10	Japan	10	29	2.90	0.71	1	4	6
	Total of the top 10 countries	494	2007	4.06	0.99	49	171	323
	Global total	539	2214	4.11	1.00			
	Share of the Top 10 countries in the global total	91.65	90.65					

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication; **RCT:** Relative Citation Index; **TLS:** Total Link Strength.

Malaya Medical Centre, Malaysia, achieving a high CPP and RCI of 11 and 2.680, followed by Fondazione Polilinico Universitario Agostino Gemelli. IRCCS, Italy (8.50 and 2.07), The Aga Khan University, Karachi, Pakistan (7.6 and 1.85), Universitas Airlangga, Indonesia (7.0 and 1.7), Singapore General Hospital (6.27 and 1.53), Government Medical College and Hospital, Chandigarh, India (6.2 and 1.51), Seremban Hospital, Malaysia (4.4 and 1.07), Tan Tock SEng Hospital, Singapore (3.79 and 0.92) and Universiti Malaysia (3.73 and 0.91) (Table 3).

Co-authorship Network Analysis of the Top 20 Organisations

A total of 454 organisations contributed to the dataset, of which 23 met the minimum threshold of five publications. Among them, the top 20 organisations with TLS were selected for further co-authorship analysis. The co-authorship map (Figure 3) is divided into 11 clusters, comprising 18 collaborative links and an overall TLS of 30. Cluster 1 contains four organisations, cluster 2 includes three organisations, clusters 3 and 6 consist of two organisations each, while clusters 7 to 11 each contain a single organisation. The Universiti Malaya (41), Universiti Kebangsaan Malaysia (32), and Universiti Putra Malaysia (7) exhibit the highest collaborative intensity, each demonstrating five co-authorship links. Universiti Sains Malaysia (37) follows closely with four established links. These universities form the core of collaborative networks, highlighting strong inter-institutional research partnerships. Other institutions, such as Tan Tock Seng Hospital (24) and Woodlands Health Singapore (7), also display significant collaborative ties, strengthening regional and cross-border research linkages.

Most Productive Authors

A total of 498 authors contributed to research in the MOJ from 2015 to 2024, of which 323 authors published 1 paper each, 111

Table 3: Top 20 Organisations with five or more papers.

Sl. No.	Name of the organisation	TP	TC	CPP	RCI	ICP	% ICP	TLS
1	Universiti Malaysia	41	153	3.73	0.91	3	7.32	21
2	Universiti Sains Malaysia	37	122	3.30	0.80	0	0.00	23
3	Universiti Kabamgsaan Malaysia	32	60	1.88	0.46	1	3.13	17
4	Tan Tock Seng Hospital, Singapore	24	91	3.79	0.92	0	0.00	10
5	International Islamic University, Malaysia	15	18	1.20	0.29	0	0.00	7
6	Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India	12	34	2.83	0.69	1	8.33	7
7	Singapore General Hospital	11	69	6.27	1.53	2	18.18	9
8	Kuala Lumpur Hospital, Malaysia	11	30	2.73	0.66	0	0.00	8
9	Khoo Teck Puat Hospital, Singapore	11	17	1.55	0.38	3	27.27	9
10	International Medical University, Malaysia	9	28	3.11	0.76	0	0.00	8
11	Universitas Airlangga, Indonesia	9	63	7.00	1.70	0	0.00	8
12	Universiti Putra Malaysia	7	19	2.71	0.66	0	0.00	11
13	Woodlands Health, Singapore	7	23	3.29	0.80	0	0.00	7
14	Universiti Malaysia Sarawak, Malaysia	6	13	2.17	0.53	0	0.00	6
15	Fondazione Polilinoco Universitario Agostino Gemelli. IRCCS, Italy	6	51	8.50	2.07	0	0.00	5
16	Government Medical College and Hospital, Chandigarh, India	5	31	6.20	1.51	0	0.00	2
17	University of Malaya Medical Centre, Malaysia	5	55	11.00	2.68	1	20.00	3
18	Manipal Academy of Higher Education, India	5	7	1.40	0.34	0	0.00	5
19	Seremban Hospital, Malaysia	5	22	4.40	1.07	0	0.00	4
20	The Aga Khan University, Karachi, Pakistan	5	38	7.60	1.85	0	0.00	0
	Total of the top 20 organisations	263	944	3.59	0.87	11	4.18	170
	Total publications	539	2214	4.11	1.00		0.00	
	Share of the top 20 organisations in total papers	48.79	42.64					

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication; **RCI:** Relative Citation Index; **ICP:** International Collaborative Papers; **TLS:** Total Link Strength.

Table 4: Top 19 Authors with five or more papers in Malaysian Orthopaedic Journal.

Sl. No.	Name of the author	Affiliation	TP	TC	CPP	RCI	TLS
1	R.Y. Kow	International Islamic University, Malaysia	15	30	2.00	0.49	36
2	C.L. Low	International Islamic University, Malaysia	11	24	2.18	0.53	27
3	W.I. Faisham	Universiti Sains Malaysia	10	16	1.60	0.39	16
4	S. Ibrahim	University Kebangsaan Malaysia	10	27	2.70	0.66	24
5	T.S. Ahmad	Universiti Malaya	9	15	1.67	0.41	21
6	I. Munajat	Universiti Sains Malaysia	8	25	3.13	0.76	28
7	A.Mansor	University of Malaya Kuala Lumpur	8	5	0.63	0.15	17
8	A. Sow	Universiti Malaya	7	57	8.14	1.98	19
9	E.B.K. Kwek	Tan Tock Seng Hospital, Singapore	7	46	6.57	1.60	15
10	D. Hadizie	University of Southern Maine Malaysia	7	41	5.86	1.43	29
11	A.R. Sulaiman	University Sains Malaysia	6	18	3.00	0.73	29
12	G.N. Solayar	International Medical University, Malaysia	5	19	3.80	0.92	14
13	J.K. Ruben	Hospital Kuala Lipis, Malaysia	5	31	6.20	1.51	19
14	E.F. Mohd	Universiti Sains Malaysia	5	16	3.20	0.78	22
15	K. Jamil	Universiti Kebandsaan Malaysia	5	4	0.80	0.19	17
16	G. Balaji	Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India	5	13	2.60	0.63	18
17	M.Y.Bajuri	Universiti Kebandsaan Malaysia	5	10	2.00	0.49	11
18	R. Ahmad	International Medical University, Malaysia	5	13	2.60	0.63	13
19	A.H.Abdul-Rashid	Universiti Kebandsaan Malaysia	5	10	2.00	0.49	20
20			138	420	3.04	0.74	395
			539	2214	4.11	1.00	
			25.60	18.97			

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication; **RCT:** Relative Citation Index; **TLS:** Total Link Strength.

authors 2 papers each, 35 authors 3 papers each, 27 authors 4-10 papers each, and 2 authors 11-15 papers each.. The top 19 authors individually contributed 5 to 15 papers and collectively produced 138 papers and garnered 420 citations, accounting for a significant 25.69% of TP and 18.97% of TC, with an average productivity of 7.26 papers per author.

Among these, seven authors surpassed the average productivity, led by R.Y. Kow (Malaysia) (15 papers), C.L. Low (Malaysia) (11 papers), W.I. Faisham (Malaysia) (10 papers), S. Ibrahim (Malaysia) (9 papers), T.S. Ahmad (Malaysia) and I. Munajat (Malaysia) (8 papers each). In terms of citation impact, 9 organisations registered a CPP and RCI higher than the overall average (3.04 and 0.74), with A. Sow (Malaysia) achieving a high CPP and RCI (8.14 and 1.98), followed by E.B.K. Kwek (Singapore)(6.57 and 1.6), J.K. Ruben (Malaysia) (6.2 and 1.51), D. Hadizie (Malaysia) (5.86 and 1.43), G.N. Solayar (Malaysia) (3.8 and 0.92), E.F. Mohd (Malaysia) (3.2 and 0.78), and I. Munajat (Malaysia) (3.13 and 0.76) (Table 4).

Co-authorship Network Analysis of the Top 20 Authors

From a total of 1,713 authors, 21 met the minimum threshold of five publications. The top 20 authors with the highest TLS were selected for detailed analysis. The co-authorship visualisation map generated using VOSviewer (Figure 4) was constructed with attraction and repulsion values set at 6 and -2, respectively. The map is divided into nine clusters, comprising 17 collaborative links and an overall TLS of 56. Cluster 1 consists of five authors, cluster 2 includes four authors, cluster 3 contains three authors, clusters 4 and 5 have two authors, and clusters 6 to 9 each contain a single author. Collaborative patterns reveal that Munajat, Ismail

(8), and Hadizie, Din (7) demonstrate the highest co-authorship connectivity, each with four links, and followed by Ibrahim, Sharaf (10), Sulaiman, Abdul Razak (6), and Mohd, Emil Fazliq (5), each maintaining three strong co-authorship links. These findings highlight the centrality of a small group of highly collaborative authors, underscoring their pivotal roles in shaping research networks within this domain.

Highly-Cited Papers (HCPs)

Among 539 papers covered in MJO from 2007 to 2024, only 14 (2.60%) were considered as HCPs, having received above 20 citations. These 14 HCPs collectively received 505 citations, averaging 36.07 CPP. The bibliometric profile of the top 14 foreign HCPs is presented in Table 5.Of the 14 total HCPs, 4 papers were from Malaysia, followed by Singapore, Thailand and the UK (2 papers each), India, Indonesia, Italy, Ireland and Sudan(1 paper each). The distribution of citations received by 14 HCPs is also uneven: 2 papers were in the citation range 52-103, as against 12 papers in the citation range 21-40. The 14 HCPs were published from 2016 to 2021, with a maximum (*n*=3 each) reported in 2018 and 2019, followed by 2 each reported in 2016, 2017 and 2020 and 1 each reported in 2019 and 2021. Among 14 HCPs (constituting 12 articles and 2 reviews), 10 involve the participation of a single organisation (zero collaboration), and 4 (three national collaborative and one international collaborative) involve the participation of two or more organisations. The 14 HCPs involve the participation of 18 organisations and 51 authors.

DISCUSSION

This bibliometric analysis of the MOJ from 2015 to 2024 offers a comprehensive overview of its publication trends, thematic foci, and collaborative networks, providing valuable insights into the journal's evolution and its contribution to orthopaedic knowledge. Over the decade, the MOJ published 539 articles, showing significant growth, particularly between 2015 and 2020, peaking at 85 annual publications in 2020. This growth signifies an increased research output and rising prominence for the journal, with an overall cumulative growth of 83.68% from 2015-2019 to 2020-2024, despite a slight decline post-2021. Foreign publications consistently outnumbered Malaysian contributions, indicating the MOJ's international appeal, although Malaysian contributions showed steady growth until 2022. The average CPP for all publications was 4.11, with foreign papers (4.52 CPP) having a slightly higher impact than Malaysian papers (3.52 CPP).

Research articles formed the majority of document types (89.24%), while reviews, despite being fewer, had the highest citation impact (25.17 CPP), highlighting their significant influence. A notable finding was the limited externally funded research, with only 3.34% of documents acknowledging external support, suggesting a reliance on institutional or self-funding that might limit research scale. In terms of study characteristics, adults were the most studied population (51.76%), and clinical studies were the dominant research design (60.85%), alongside a significant share of case reports (30.43%). Trauma, Fracture and Dislocation was the most prevalent subject area (35.44%), followed by Pediatric Trauma and Orthopaedics, and Infection and COVID-19. Papers on Infection and COVID-19 showed a

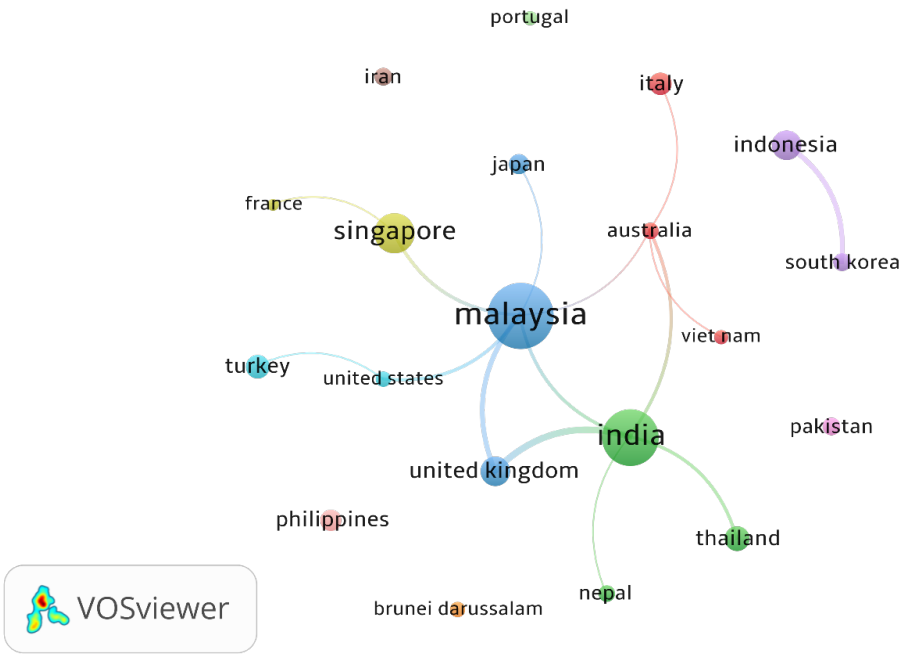

Figure 2: Co-authorship network of the top 20 countries showing clusters and collaboration strengths.

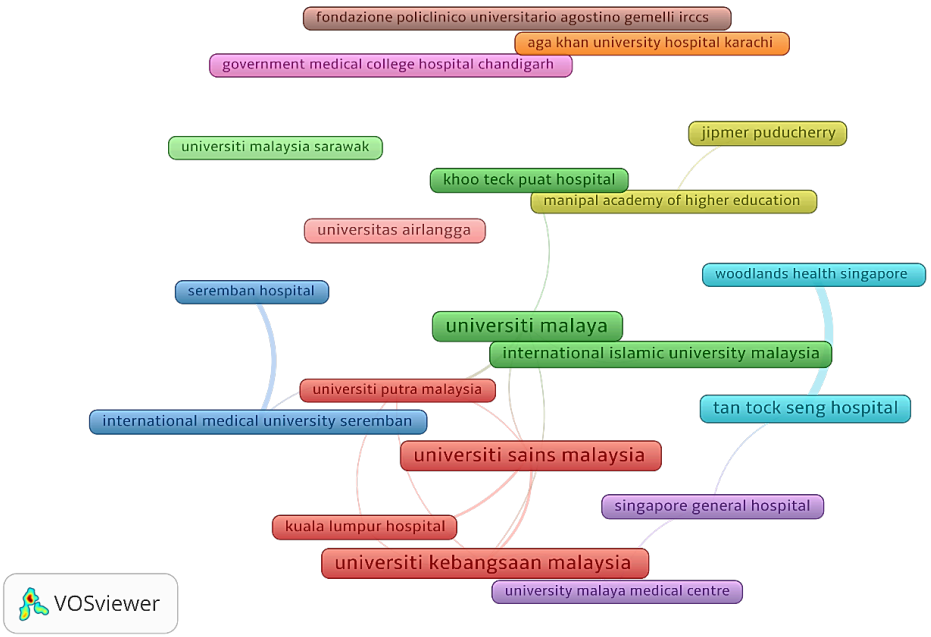

Figure 3: Co-authorship network visualisation of the top 20 organisations showing clusters and link strengths.

Annexure 2: Subject-Wise Classification of Papers in the Malaysian Orthopaedic Journal (2015-2024).

Sl. No.	Broad subject	2015-24				TP		Region	
		TP	TC	CPP	% TP	2015-19	2020-24	Malaysia	Foreign countries
1	Trauma, Fracture and Dislocation	191	808	4.23	35.44	97	144	73	168
2	Paediatrics Trauma and Orthopedics	80	284	3.55	14.84	48	60	55	35
3	Infection or Covid-19	70	346	4.94	12.99	27	57	32	48
4	Arthroplasty & Joint Displacement	57	260	4.56	10.58	26	43	17	40
5	Spine/Spinal Injury	64	60	0.94	11.87	26	38	25	39
6	Arthroscopy and Sport Injury	36	112	3.11	6.68	5	34	13	23
7	Metabolic Diseases	25	94	3.76	4.64	11	14	6	19
8	Cancer or Tumor	22	70	3.18	4.08	9	13	11	11
9	Regenerative Medicine	1	3	3.00	0.19	0	1	1	0
		539	2214	4.11					

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

high citation impact (4.94 CPP), reflecting their timely relevance, especially during the recent pandemic (Patralekh *et al.*, 2021, and Li *et al.*, 2024). The knee was the most frequently studied anatomical area, aligning with common orthopaedic conditions.

Geographically, Asian countries were the most prolific contributors (91.46%), led by Malaysia, India, and Singapore. Conversely, European and African countries, despite lower publication volumes, demonstrated higher citation impacts per paper, suggesting high-quality research from these regions. The analysis identified Universiti Malaya, Universiti Sains Malaysia, and Universiti Kebangsaan Malaysia as the most productive organisations, while the University of Malaya Medical Centre, Malaysia, and Fondazione Policlinico Universitario Agostino Gemelli, Italy, had the highest citation impact. Malaysian authors R.Y. Kow and C.L. Low were the most productive. Only a small percentage of papers (2.60%) were highly cited (≥20 citations), with a collective average of 36.07 CPP, indicating concentrated impact among a few influential publications.

Table 5: Bibliometric details of the Top 14 Highly Cited Papers in the Malaysian Orthopaedic Journal.

Sl. No.	Names of authors	Affiliation of authors	Title	Source	Citations
1	Stewart, S.K.	Imperial College Department of Bioengineering, London, UK	Fracture non-union: A review of clinical challenges and future research needs.	Malaysian Orthopaedic Journal, 2019, 13(2), pp. 1-10	103
2	Saturveithan C, Premganesh G, Fakhrizzaki S, Mahathir M, Karuna K, Rauf K, William H, Akmal H, Sivapathasundaram N, Jaspreet K	Malacca General Hospital, Malaysia	Intra-articular Hyaluronic Acid (HA) and Platelet-Rich Plasma (PRP) injection versus Hyaluronic Acid (HA) injection alone in patients with grade III and IV knee Osteoarthritis (OA): A retrospective study on functional outcome.	Malaysian Orthopaedic Journal, 2016, 10(2), pp. 35-40	52
3	Kampitak W, Tanavalee A, Ngarmukos S, Amarase C,, Songthamwat B, Boonshua A.	King Chulalongkorn Memorial Hospital, Bangkok, Thailand; Chulalongkorn University, Bangkok, Thailand	Comparison of adductor canal block versus local infiltration analgesia on postoperative pain and functional outcome after total knee arthroplasty: A randomized controlled trial.	Malaysian Orthopaedic Journal, 2018, 12(1), pp. 7-14	40
4	Lua J.Y.C.; Tan V.H.; Sivasubramanian H.; Kwek E.B.K	Tan Tock Seng Hospital, Singapore	Complications of open tibial fracture management: Risk factors and treatment.	Malaysian Orthopaedic Journal, 2017, 11(1), pp. 18-22	34
5	Virani, S.R., Dahapute, A.A., Panda, I., Bava, S.S.	Seth GS Medical College and KEM Hospital, Mumbai, India	Role of local infiltration of tranexamic acid in reducing blood loss in peritrochanteric fracture surgery in the elderly population.	Malaysian Orthopaedic Journal, 2016, 10(3), pp. 26-30	34
6	Tay, X.K.K., Kamarul, T., Lok, W.Y., Wong, J., Saw, A.	Singapore General Hospital, Singapore; University Malaya Medical Centre, Kuala Lumpur, Malaysia; KK Women's and Children Hospital, Singapore;	COVID-19 in Singapore and Malaysia: Rising to the challenges of orthopaedic practice in an evolving pandemic.	Malaysian Orthopaedic Journal, 2020, 14(2), pp. 1-10	33
7	Saw, A.	University of Malaya, Kuala Lumpur, Malaysia	A new approach to body donation for medical education: The silent mentor programme.	Malaysian Orthopaedic Journal, 2018, 12(2), pp. 68-72	33
8	Komang-Agung, I.S., Dwi-Purnomo, S.B., Susilowati, A.	Airlangga University, Surabaya, Indonesia;	Prevalence rate of adolescent idiopathic scoliosis: Results of school-based screening in surabaya, Indonesia.	Malaysian Orthopaedic Journal, 2017, 11(3), pp. 17-22	32

Sl. No.	Names of authors	Affiliation of authors	Title	Source	Citations
9	Passiatore, M., Perna, A., De-Vitis, R., Taccardo, G.	Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy;	The use of alfa-lipoic acid-r (Ala-r) in patients with mild-moderate carpal tunnel syndrome: A randomised controlled open label prospective study.	Malaysian Orthopaedic Journal, 2020, 14(1), pp. 1-6	30
10	Esa, A., Connolly, K.D., Williams, R., Archer, C.W.	Cardiff University, Cardiff, Swansea U<niversity, UK	Extracellular vesicles in the synovial joint: Is there a role in the pathophysiology of osteoarthritis?	Malaysian Orthopaedic Journal, 2019, 13(1), pp. 1-7	25
11	Dhillon, K.S.	KPJ Selangor Specialist Hospital, Selangor, Malaysia	Subacromial impingement syndrome of the shoulder: A musculoskeletal disorder or a medical myth?	Malaysian Orthopaedic Journal, 2019, 13(3), pp. 1-7	23
12	Timon, C., Keady, C., Murphy, C.G.	Galway University Hospitals, Galway, Ireland	Fat embolism syndrome-A qualitative review of its incidence, presentation, pathogenesis and management.	Malaysian Orthopaedic Journal, 2021, 15(1), pp. 1-11	22
13	Limpaphayom, N., Sailohit, P.	Chulalongkorn University, Bangkok, Thailand	Factors related to early recurrence of idiopathic clubfoot post the Ponseti method.	Malaysian Orthopaedic Journal, 2019, 13(3), pp. 28-33	22
14	Gashi, Y.N., Elhadi, A.S., Elbushra, I.M.	University of Khartoum, Khartoum, Sudan; Ibrahim Malik Teaching Hospital, Khartoum, Sudan; Best Care Hospital, Khartoum, Sudan	Outcome of primary cemented bipolar hemiarthroplasty compared with dynamic hip screw in elderly patients with unstable intertrochanteric fracture.	Malaysian Orthopaedic Journal, 2018, 12(1), pp. 36-41	21

The MOJ's observed growth in publication output aligns with global trends in scientific publishing (Bornmann and Mutz, 2015). Similar bibliometric studies on other regional orthopaedic journals or medical fields in Asia have also reported consistent growth (Paleti *et al.*, 2025), as seen in orthopaedic research in Arab countries (Alomar *et al.*, 2024, and Vaishya *et al.*, 2025). The dominance of research articles and high citation impact of review articles are consistent patterns across various scientific disciplines, as reviews often synthesise knowledge (Falagas *et al.*, 2008). The relatively low proportion of externally funded research in MOJ publications might diverge from more established international journals, which often feature more grant-funded studies (NIH Funding, 2025). The prevalence of "Trauma, Fracture and Dislocation" is common in orthopaedic research globally due to high injury incidence (Xiong *et al.*, 2018). However, the significant contribution of "Infection and COVID-19" highlights the journal's responsiveness to contemporary health crises, a trend also seen in other medical publications during the pandemic (Patralekh *et al.*, 2021, and Li *et al.*, 2024). The strong representation of Asian countries in the MOJ's publications is expected, given its regional focus. However, the higher citation impact of papers from European and African countries, despite lower volumes, suggests the journal attracts high-impact contributions from outside Asia, mirroring findings in other regional journal analyses where international collaborations often lead to higher citation rates (Wagner, 2005; Moher, 2009; Booth,2016; Ioannidis, 2005). The identification of key productive organisations and authors provides a valuable mapping of influential research hubs and individuals within the MOJ's network (Zupic and Carter, 2014). This aligns with other bibliometric studies in orthopaedics, including those by Vaishya *et al.*, who have analysed publication trends in various orthopaedic journals and subspecialties (Patralekh, 2021; Vishwanathan, 2021; Karlapudi, 2022; Vaishya, 2022).

These findings have significant clinical relevance for orthopaedic practice and policy. The predominance of research on "Trauma, Fracture and Dislocation" and common anatomical regions indicates that the MOJ's published research addresses prevalent

Annexure3: Distribution of papers by anatomical regions.

Sl. No.	Name of the Region	2015-24				2015-24		2015-24	
		TP	TC	CPP	% TP	2015-19	2020-24	Malaysia	Foreign countries
1	Knee	99	461	4.66	18.37	34	65	21	78
2	Hip	78	226	2.90	14.47	24	54	22	56
3	Shoulder	55	152	2.76	10.20	22	33	16	39
4	Neck	32	98	3.06	5.94	8	24	12	20
5	Head	24	39	1.63	4.45	8	16	7	17
6	Ankle	42	126	3.00	7.79	13	29	13	29
7	Elbow	28	98	3.50	5.19	14	14	4	24
8	Foot	37	134	3.62	6.86	10	27	10	27
9	Leg	23	71	3.09	4.27	12	11	12	11
10	Face	3	11	3.67	0.56	1	2	0	3
11	Skull	3	8	2.67	0.56	1	2	2	1
		539	2214	4.11					

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

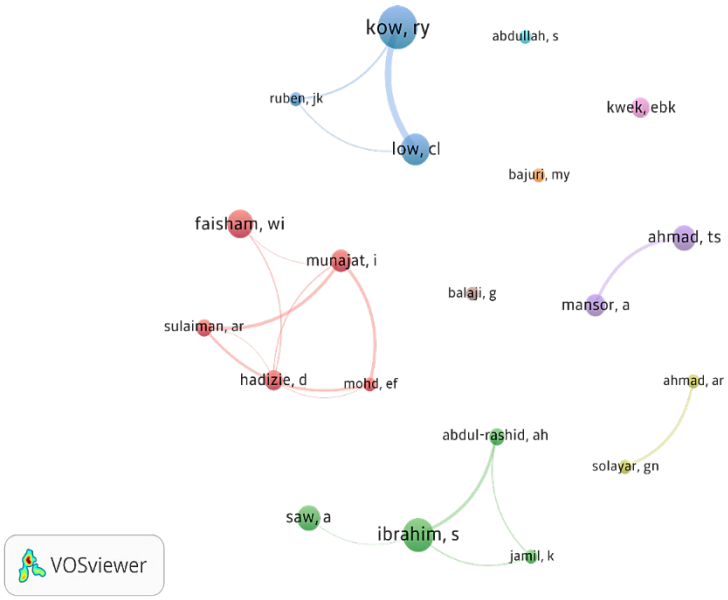

Figure 4: Co-authorship network visualisation of the top 20 authors showing clusters and link strengths.

musculoskeletal health issues, aiding clinicians in informed decision-making. The high citation impact of review articles and papers on "Infection and COVID-19" suggests their influence on clinical guidelines or public health responses. Identifying productive organisations and authors can foster networking and collaboration among clinicians and researchers, fostering the translation of research findings into clinical practice. Insights into funding patterns can also inform strategies for securing more external grants, enabling larger, more robust clinical studies. Ultimately, by mapping the research landscape, this study contributes to optimising research efforts to better serve patient needs and improve orthopaedic care.

The study's primary strength lies in its comprehensive and systematic analysis of a decade of publications from a single, regionally significant orthopaedic journal, providing a granular understanding of its unique contributions and trends. The use of a robust search strategy and detailed extraction of various bibliometric indicators enhances the depth and reliability of the findings. The inclusion of highly cited papers also offers a qualitative dimension. Despite its strengths, limitations include confinement to the Scopus database, potentially underestimating

the journal's complete output. Bibliometric analyses inherently rely on quantitative metrics, which may not fully capture qualitative impact or clinical significance. Manual categorisation of papers by broad subject areas could introduce subjectivity. The study period (2015-2024) provides a snapshot but does not account for long-term historical trends. The relatively low proportion of funded research identified might also be influenced by incomplete reporting of funding sources.

Based on these findings and limitations, several avenues for future research emerge. Firstly, a comparative bibliometric analysis involving other regional orthopaedic journals or a broader set of Asian orthopaedic publications could provide a more comprehensive understanding of the regional research landscape and identify areas of collaborative potential. Secondly, future studies could delve deeper into the specific methodologies and research designs employed in MOJ publications, assessing the quality of evidence generated. Thirdly, an investigation into the factors influencing citation impact within the MOJ, beyond just the type of article or author affiliation, could offer insights into what makes research influential. This might involve qualitative analyses of HCPs to identify common characteristics or themes. Fourthly, exploring the impact of funding on research output and citation performance within the MOJ could provide valuable data for advocating for increased research investment.

Annexure 4: Distribution of papers by orthopaedic region subfield.

Sl. No.	Subfield	2015-24				TP		Country	
		TP	TC	CPP	%TP	2015-19	2020-24	Malaysia	Foreign Countries
1	Total Knee Arthroplasty	27	177	6.56	5.01	13	14	4	23
2	Hip Fracture	21	73	3.48	3.90	3	18	3	17
3	Disability of the Arm, Shoulder and Hand	19	50	2.63	3.53	7	12	4	14
4	Hip Arthroplasty	18	28	1.56	3.34	4	14	4	15
5	Total Hip Arthroplasty	14	39	2.79	2.60	1	13	4	12
6	Anterior Cruciate Ligament Reconstruction	13	32	2.46	2.41	0	13	4	13
7	Knee Osteoarthritis	10	86	8.60	1.86	4	6	2	8
8	Knee Radiography	8	46	5.75	1.48	4	4	2	6
9	Ankle Injury	8	30	3.75	1.48	3	5	3	7
10	Ankle Fracture	8	15	1.88	1.48	2	6	3	7
11	Shoulder Dislocation	7	13	1.86	1.30	4	3	0	7
12	Elbow Flexion	7	26	3.71	1.30	4	3	0	7
13	Shoulder Injury	6	19	3.17	1.11	2	4	2	5
14	Ankle Pain	6	15	2.50	1.11	1	5	3	4
15	Elbow Radiography	6	20	3.33	1.11	6	0	2	4
16	Elbow Dislocation	6	32	5.33	1.11	6	0	2	4
17	Diabetic Foot	6	35	5.83	1.11	0	6	3	3
18	Leg Length Inequality	6	8	1.33	1.11	3	3	4	4
19	Knee Meniscus	6	19	3.17	1.11	1	5	1	7
20	Knee Injury	5	13	2.60	0.93	1	4	2	5
21	Knee Dislocation	5	9	1.80	0.93	2	3	0	5
22	Knee Arthroplasty	5	66	13.20	0.93	3	2	0	5
23	Rotator Cuff Rupture	5	5	1.00	0.93	0	5	2	3
24	Club Foot	5	29	5.80	0.93	3	2	2	3
25	Oxford Shoulder Score	5	9	1.80	0.93	3	2	1	4
26	Knee Society Score	4	20	5.00	0.74	1	3	0	4
27	Knee Instability	4	1	0.25	0.74	0	4	1	3
28	Total Hip Prosthesis	4	17	4.25	0.74	4	0	1	3

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

Annexure 5: Distribution of papers by the bones.

Sl. No.	Name of the bone	2015-24				TP		TP	
		TP	TC	CPP	%TP	2015-19	2020-24	Malaysia	Foreign Countries
1	Femur/Femoral	100	354	3.54	18.55	28	72	32	68
2	Tibia/Tibial	60	352	5.87	11.13	20	40	19	41
3	Acetabulum	11	18	1.64	2.04	2	9	7	4
4	Radius/Radial	30	103	3.43	5.57	14	16	11	19
5	Pelvic/Pelvis	18	93	5.17	3.34	8	10	4	14
6	Patellar	7	38	5.43	1.30	3	4	1	6
7	Humerus/Humeral	19	64	3.37	3.53	9	10	4	15
8	Ulna	9	40	4.44	1.67	5	4	4	5
9	Clavicle	12	42	3.50	2.23	8	4	3	9
10	Fibula	15	32	2.13	2.78	4	11	5	10
11	Scapula	4	36	9.00	0.74	3	1	0	4
12	Scaphoid	5	14	2.80	0.93	1	4	2	3
13	Ribs	3	3			1	2	1	2
		539	2214	4.11					

TP: Total Publications; **TC:** Total Citations; **CPP:** Citations Per Publication.

Finally, a longitudinal study extending beyond 2024 could track the continued evolution of the MOJ's research profile and assess the long-term effects of current trends and initiatives. This would allow for a more dynamic understanding of the orthopaedic research landscape in the region.

CONCLUSION

The Malaysian Orthopaedic Journal exhibited substantial growth in publications from 2015 to 2024, demonstrating its increasing role as a platform for orthopaedic research with a strong international presence. Foreign contributions outnumbered Malaysian papers and showed a higher citation impact. A notable finding was the low percentage of externally funded research, suggesting an area for future development and potential reliance on institutional or self-funding. The journal's research primarily focused on prevalent musculoskeletal conditions, particularly trauma, and while Asian countries contributed the most papers, European and African countries showed higher citation impacts per publication.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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