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Research Article

Spondylosis: A Scientometric Assessment of Global Publications Output during 2008-17

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Abstract

The present study examined 1839 global spondylosis research publications, as indexed in Scopus database during 2008-17, with a view to understand their growth rate, global share, citation impact, international collaborative papers share, distribution of publications by broad subjects, productivity and citation profile of top organizations and authors, preferred media of communication and characteristics of high cited papers. The global publications on spondylosis research registered an annual average growth rate of 4.43% and its citation impact averaged to 15.44 citations per paper. The global share of top 10 most productive countries in spondylosis research ranged from 3.97% to 32.84% with largest global publication share coming from USA (32.84%), followed by U.K. (11.69%), Japan (7.94%), Germany and France (5.55% and 5.33%), etc. during 2008-17. Together, the top 10 most productive countries accounted for 86.03% of the world output during 2007-16, which increased from 84.62% during 2008-12 to 87.12% during 2013-17. Among five broad subjects, medicine contributed the largest publications share of 90.81%, followed by Among sub-fields, medicine registered the highest publications share (90.81%), followed by biochemistry, genetics and molecular biology (13.43%), immunology and microbiology (6.63%), neurosciences (6.31%) and pharmacology, toxicology and pharmaceutics (5.33%) during 2008-17. Among various organizations and authors contributing to global spondylosis research, the 15 most productive global organizations and authors together contributed 18.22% and 11.5% respectively as their share of global publication output and 29.86% and 22.03% respectively as their share of global citation output during 2008-17. Among 41818 journal papers in global spondylosis research, the top 15 most productive journals contributed 19.64% share of total journal publication output during 2007-16, which decreased from 21.26% to 18.38% from 2008-12 to 2013-17. Sixty four publications were found to be high cited, as they registered citations from 100 to 806 during 2007-16 and they together received 11683 citations, which averaged to 182.55 citations per papers.

Keywords: *Spondylosis; Arthritis; Spine; Global publications; Scientometrics; Bibliometrics*

Introduction

"Arthritis" is a term for more than 100 types of joint disease or related conditions-and each type differs from the next. Spondylosis, which is osteoarthritis of the spine, is degenerative in nature. In other words, it develops over time. Other forms of inflammatory arthritis-like rheumatoid arthritis-are triggered by an autoimmune problem that may cause the body to attack its own healthy tissues and cells. Although inflammatory arthritis can affect any part of the body, there are four types that may affect the spine: (i) Spondylosis; also called spinal osteoarthritis (OA), (ii) Rheumatoid arthritis (RA), (iii) Ankylosing spondylitis (AS) and (iv) Juvenile idiopathic arthritis (JIA).

Spondylosis or spinal osteoarthritis (OA) occurs when the protective cartilage and/or fluid inside one or more facet joints break down. This is usually a degenerative process that may be caused by wear and tear, overuse or injury. In the body's efforts to control the progression of this joint disease, it makes new bone called osteophytes, also called bone spurs. Bone spurs can contribute to neck, back and related extremity pain when the spur pinches (compresses) a spinal nerve [1,2].

Spondylosis can affect any region of the spine: cervical (neck), thoracic (upper, mid back), lumbar (low back) or lumbosacral (low back/sacrum). Most patients with spondylosis do not require spine surgery. OA is the most common form of arthritis. Aging is the primary cause of OA. Normal age-related cellular changes, along with daily wear and tear, can affect the structural integrity of the spine's discs. Degenerative disc changes can cause discs to weaken, become thin, or herniate. These structural changes may also contribute to the formation of osteophytes. Genetics also may predispose you to develop spondylosis [1,2].

Literature Review

No bibliometric study has been undertaken so far on national and international research output on spondylosis research. However, only few bibliometric studies have been carried out on arthritis research, osteoarthritis and rheumatoid arthritis. Amongst arthritis research output, Lewison and Devey [3] used bibliometric methods to evaluate the magnitude and quality of publications in arthritis research during 1988-1995 in the UK and also compared this with that of other 12 countries. The publication data were by number, research level (from clinical to basic) and potential impact on other researchers (from low to high). The UK has a strong presence in arthritis research and the highest relative commitment of all the countries studied. Papers with funding acknowledgements were of significantly higher impact and less clinical than those without. Gupta, Mueen Ahmed and Gupta [4] studied the growth India's research output in arthritis research during 2007-16, its citation impact; its international collaboration share, distribution by broad subject areas, the types of arthritis research; publication productivity and citation impact of top 15 most productive organizations and authors; the modes of communication and identification of most productive journals and the characteristics of its top 15 highly cited papers. In the area of osteoarthritis, by Kumar, Goel, Gupta and Gupta [5] have examined 792 Indian publications during 2007-16. Only one literature review is available on rheumatoid arthritis research in India, where Handa, Rao, Lewis, Juliana, Rambhad, Shiff and Ghia [6] provided a literature review of observational studies published from 1985 to 2012 and this review identified twenty-eight studies. Of the 28 studies, seven described the descriptive epidemiology of RA, 14 described comorbidities and extra-articular manifestations, nine described the functioning abilities and quality of life among patients, and 10 provided information on treatments. Since no national and international bibliometric study was available in this area, as a result we decided to undertake the present study

Objectives

The main objectives of this study are to study the performance of global spondylosis research during 2007-16, based on publications covered in Scopus database. In particular, the study focuses on the following objectives: (i) to study the growth of world research output and its citation impact; (ii) to study the contribution and citation impact of top 10 most productive countries of the world; (iii) to study global research output by broad subject areas and study their growth and decline; (iv) to study the publication productivity and citation impact of 15 most productive organizations and authors; (v) to study the leading medium of communication and (vi) to study the characteristics of top 64 highly cited papers.

Methodology

The study retrieved and downloaded the publication data of the world in spondylosis research, using the international and multidisciplinary Scopus database (http://www.scopus.com) for 10 years during 2008-17. Keyword such as "spondylosis" was used in "Keyword" tag or "Article Title" tag and restricting it to the period 2008-17 in "date range tag" was used for searching the global publication data and this becomes the main search string. When the main search string with restricted to individual top 10 most productive country name in "country tag", the publication data on the individual country in spondylosis research was obtained. The search string is further restricted to "subject area tag", "country tag", "source title tag", "journal title name" and "affiliation tag", to get information on the distribution of publications by subject, collaborating countries, author-wise, organization-wise and journal-wise, etc. For citation data, citations to publications were also collected from the date of publication till 20 February 2018. A number of absolute and relative bibliometric indicators have been used to measure the performance of global research in terms of publications and citations in spondylosis research.

(((KEY(spondylosis) OR TITLE(spondylosis)) AND PUBYEAR > 2006 AND PUBYEAR < 2017) or ((KEY(spinal osteoarthritis) OR TITLE(spinal osteoarthritis)) AND PUBYEAR > 2006 AND PUBYEAR < 2017))

Analysis

The world has published 1839 publications on spondylosis research in 10 years during 2008-17, which increased from 152 publications in 2008 to 184 publications in 2017, registering annual average growth rates of 4.43%. The cumulative growth of world publications on spondylosis increased from 806 during 2008-12 to 1033 publications during 2013-17, witnessing a growth rate of 28.16%. The average citation per publication (CPP) registered by global publications on spondylosis research was 15.44 during 2008-17, which decreased from 26.02 during 2008-12 to 7.18 during 2013-17 (Table 1).

Publication Period	World		
	TP	TC	CPP
2008	152	4547	29.91
2009	146	4928	33.75
2010	142	3434	24.18
2011	196	5525	28.19
2012	170	2536	14.92
2013	245	2951	12.04
2014	213	2027	9.52
2015	175	1532	8.75
2016	216	785	3.63
2017	184	127	0.69
2008-12	806	20970	26.02
2013-17	1033	7422	7.18
2008-17	1839	28392	15.44

Table 1: *World Literature on Spondylosis: Growth and Citation Impact, 2008-17.*

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper

Global Publication Share and Citation Impact of Top 10 Most Productive Countries

The spondylosis research global output originated in more than 82 countries during 2008-17, of which 52 countries contributed 1 - 10 papers each, 17 countries 11 - 50 papers each, 9 countries 51 - 100 papers each, 2 countries 101 - 200 papers each and 2 countries 215 - 604 papers each during 2008-17. Table 2 lists the output of top 10 most productive countries in spondylosis research during 2008-17. The publication share of 10 most productive countries in spondylosis was 86.03% of the world output during 2007-16, which increased from 84.62% during 2008-12 to 87.12% during 2013-17. Individually, the global publication share of these 10 countries varied from 3.97% to 32.84% during 2007-16, with highest publication share (32.84%) coming from USA, followed by U.K. (11.69%), Japan (7.94%), Germany and France (5.55% and 5.33%), Italy, Canada, China and Australia (from 4.57% to 4.89%) and South Korea (3.97%) during 2008-17. The global publication share has increased by 3.59% in China, followed by 2.43% in South Korea, 1.76% in Japan, 0.82% in Germany, 0.40% in Australia and 0.32% in Italy, as against decrease by 4.04% in USA, 1.50% in U.K, 1.05% in Canada and 0.23% in France from 2008-12 to 2013-16. Six out of 10 countries have scored relative citation index more than 1.25: Germany (1.65), U.K. (1.51), USA and France (1.48 each), Canada (1.38) and Australia (1.34) during 2008-17.

S. No	Name of Country	Number of Publications			Share of Publications			TC	CPP	RCI
		2008-12	2013-17	2008-17	2008-12	2013-17	2008-17	2008-17		
1	USA	283	321	604	35.11	31.07	32.84	13843	22.92	1.48
2	U.K.	101	114	215	12.53	11.04	11.69	4996	23.24	1.51
3	Japan	56	90	146	6.95	8.71	7.94	1974	13.52	0.88
4	Germany	41	61	102	5.09	5.91	5.55	2606	25.55	1.65
5	France	44	54	98	5.46	5.23	5.33	2242	22.88	1.48
6	Italy	38	52	90	4.71	5.03	4.89	1498	16.64	1.08
7	Canada	42	43	85	5.21	4.16	4.62	1805	21.24	1.38
8	China	21	64	85	2.61	6.20	4.62	841	9.89	0.64
9	Australia	35	49	84	4.34	4.74	4.57	1740	20.71	1.34
10	South Korea	21	52	73	2.61	5.03	3.97	509	6.97	0.45
	Total	682	900	1582	84.62	87.12	86.03	32054	20.26	1.31
	World Total	806	1033	1839				28392	15.44	

Table 2: *Top 10 Countries Publication Output, Global Publication Share and Citation Impact in Spondylosis Research during 2008-17.*

Subject-Wise Distribution of Research Output

As per the Scopus database classification, the global spondylosis research output is distributed across five sub-fields during 2008-17. Among sub-fields, medicine registered the highest publications share (90.81%), followed by biochemistry, genetics and molecular biology (13.43%), immunology and microbiology (6.63%), neurosciences (6.31%) and pharmacology, toxicology and pharmaceutics (5.33%) during 2008-17. The publication activity, as seen through activity index from 2008-12 to 2013-17, witnessed decrease in medicine (from 100.69 to 99.46), biochemistry, genetics and molecular biology (from 105.31 to 95.86), immunology and microbiology (from 117.82 to 86.09), neurosciences (from 131.78 to 75.20) and pharmacology, toxicology and pharmaceutics (from 107.10 to 94.46) from 2008-12 to 2013-17. In terms of citation impact per paper, neurosciences, among sub-fields, registered the highest CPP of 33.30, followed by pharmacology, toxicology and pharmaceutics (26.65), immunology and microbiology (22.19), biochemistry, genetics and molecular biology (22.10) and medicine (15.30) during 2008-17 (Table 3).

S. No	Subject*	Number of Papers (TP)			Activity Index		TC	CPP	%TP
		2008-12	2013-17	2008-17	2008-12	2013-17	2008-17	2008-17	2008-17
1	Medicine	737	933	1670	100.69	99.46	25545	15.30	90.81
2	Biochemistry, Genetics and Molecular Biology	114	133	247	105.31	95.86	5458	22.10	13.43
3	Immunology and Microbiology	63	59	122	117.82	86.09	2707	22.19	6.63
4	Neurosciences	67	49	116	131.78	75.20	3863	33.30	6.31
5	Pharmacology, Toxicology and Pharmaceutics	46	52	98	107.10	94.46	2612	26.65	5.33
	World Output	806	1033	1839					

Table 3: *Subject-Wise Breakup of Global Publications in Spondylosis Research during 2008-17.*

**There is overlapping of literature under various subjects.*

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper

Profile of Top 15 Most Productive Organizations

657 organizations participated in global spondylosis research, of which 527 organizations contributed 1 - 5 papers, 89 organizations 6 - 10 papers, 32 organizations 11 - 20 papers and 9 organizations 21 - 33 papers. The productivity of 15 most productive organizations in spondylosis research varied from 17 to 33 publications and together contributed 18.22% (335 publications) publication share and 29.86% (8477) citation share to its cumulative publications output during 2008-17. The scientometric profile of these 15 organizations is presented in table 4:

S. No	Name of the Organization	TP	TC	CPP	HI	ICP	%ICP	RCI
1	Harvard Medical School, USA	33	2065	62.58	15	9	27.27	4.05
2	University of California, San Francisco, USA	33	841	25.48	15	9	27.27	1.65
3	VA Medical Center	28	645	23.04	11	9	32.14	1.49
4	Rush University, Medical Centre, USA	24	578	24.08	13	9	37.50	1.56
5	University of Nottingham, U.K.	23	386	16.78	11	5	21.74	1.09
6	Mayo Clinic, Rochester, USA	22	449	20.41	9	8	36.36	1.32
7	University of Sydney, Australia	22	549	24.95	13	13	59.09	1.62
8	INSERM, France	21	222	10.57	9	6	28.57	0.68
9	University of Tokyo, Japan	21	603	28.71	11	0	0.00	1.86
10	Kings College, London, U.K.	20	605	30.25	11	9	45.00	1.96
11	University of Southampton, U.K.	19	345	18.16	10	14	73.68	1.18
12	University of Oxford, U.K	18	340	18.89	9	14	77.78	1.22
13	University of Pittsburg, USA	17	394	23.18	11	8	47.06	1.50
14	University of Toronto, Canada	17	252	14.82	10	5	29.41	0.96
15	University of North Carolina at Chapel Hill	17	203	11.94	9	3	17.65	0.77
	Total of 15 organizations	335	8477	25.30	11.13	121	36.12	1.64
	Total of World	1839	28392	15.44				
	Share of top 15 organizations in World's total	18.22	29.86					

Table 4: *Scientometric Profile of Top 15 Most Productive Global Organizations in Spondylosis Research during 2008-17.*

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper; HI: h-index; ICP: International Collaborative Papers; RCI: Relative Citation Index

- Five organizations have registered higher publications output than the group average of 22.33: Harvard Medical School, USA and University of California, San Francisco, USA (33 papers each), VA Medical Center, USA (28 papers), Rush University, Medical Centre, USA (24 papers) and University of Nottingham, U.K. (23 papers) during 2008-17.
- Four organizations have registered more than the average citation per publication (25.30) Harvard Medical School, USA (62.58), Kings College, London, U.K (30.25), University of Tokyo, Japan (28.71) and University of California, San Francisco, USA (25.48) during 2008-17.
- Four organizations have registered more than the average h-index (11.13): Harvard Medical School, USA and University of California, San Francisco, USA (15 each), University of Sydney, Australia and Rush University, Medical Centre, USA (13 each) during 208-17.
- Seven organizations have achieved more than the average share of international collaborative publications (36.12%): University of Oxford, U.K (77.78%), University of Southampton, U.K (73.68%), University of Sydney, Australia (59.09%), University of Pittsburg, USA (47.06%), Kings College, London, U.K. (45.0%), Rush University, Medical Centre, USA (37.50%) and Mayo Clinic, Rochester, USA (36.36%) during 2008-17.

- Four organizations have registered the relative citation index more than average (1.64): Harvard Medical School, USA (4.05), Kings College, London, U.K. (1.96), University of Tokyo, Japan (1.86) and University of California, San Francisco, USA (1.65) during 2008-17.

Profile of Top 15 Most Productive Authors

929 authors participated in global Spondylosis research, of which 882 authors contributed 1 - 5 papers each, 43 authors 6 - 10 papers each and 14 authors 11 - 18 papers each. The productivity of 15 most productive authors in Spondylosis research varied from 9 to 18 publications and together contributed 11.15% (205 publications) publication share and 22.03% (6256) citation share to its cumulative publications output during 2008-17. The scientometric profile of these 15 authors is presented in table 5:

S. No	Name of the Author	Affiliation of the Author	TP	TC	CPP	HI	ICP	%ICP	RCI
1	N. Yoshimura	University of Tokyo, Japan	18	558	31.00	10	0	0	2.01
2	A. Guermazi	Boston University, School of Medicine, USA	16	599	37.44	13	9	56.25	2.42
3	S. Muraki	University of Tokyo, Japan	16	553	34.56	10	0	0	2.24
4	T. Akune	University of Tokyo, Japan	15	552	36.80	10	0	0	2.38
5	D.J. Hunter	Boston University, School of Medicine, USA	15	568	37.87	12	9	60.00	2.45
6	H. Kawaguchi	University of Tokyo, Japan	15	552	36.80	10	0	0	2.38
7	H. Oka	University of Tokyo, Japan	15	552	36.80	10	0	0	2.38
8	K. Nakamura	University of Tokyo, Japan	14	243	17.36	7	0	0	1.12
9	V. Chapman	University of Nottingham, U.K.	13	296	22.77	9	2	15.38	1.47
10	C. Cooper	University of Oxford, U.K.	13	193	14.85	8	9	69.23	0.96
11	L. Kalichman	Boston University, School of Medicine, USA	12	395	32.92	8	6	50.00	2.13
12	K. Nakamura	University of Occupational and Environmental Health, Japan	12	362	30.17	8	1	8.33	1.95
13	J.M. Jordan	University of North Carolina at Chapel Hill, USA	11	104	9.45	7	3	27.27	0.61
14	M. Yoshida	Wakayama Medical University, Japan	11	435	39.55	8	0	0.00	2.56
15	H.J. Im	Rush University Medical Centre, USA	9	294	32.67	7	6	66.67	2.12
		Total of 15 authors	205	6256	30.52	9.13	45	21.95	1.98
		Total of the World	1839	28392	15.44				
		Share of 15 authors in World output	11.15	22.03					

Table 5: *Top 15 Most Productive Authors in Spondylosis Research, 2008-17.*

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper; HI: h-index; ICP: International Collaborative Papers; RCI: Relative Citation Index

- Eight authors have registered higher publications output than the group average of 13.67: N. Yoshimura (Japan) (18 papers), A. Guermazi (USA) (16 papers), S. Muraki (Japan) (16 papers), T. Akune (Japan), D.J. Hunter (USA), H. Kawaguchi (Japan) and H. Oka (Japan) (15 papers each) during 2008-17.
- Ten authors have registered more than the average citation per publication (30.52) of all authors: M. Yoshida (Japan) (39.55), D.J. Hunter (USA) (37.87), A. Guermazi (USA) (37.44), T. Akune (Japan), H. Kawaguchi (Japan) and H. Oka (Japan) (36.8% each), S. Muraki (34.56), L. Kalichman (USA) (32.92), H.J. Im (USA) (32.67) and N. Yoshimura (Japan) (31.0) during 2008-17.

- Seven authors have registered more than the average h-index (9.13) of all authors: A. Guermazi (USA)(13), D.J. Hunter (USA) (12), T. Akune (Japan), H. Kawaguchi (Japan), H. Oka (Japan), S. Muraki (Japan) and N. Yoshimura (Japan) (10 each) during 2008-17.
- Six authors have achieved more than the average share of international collaborative publications (21.95%) of all authors: C. Cooper (U.K) (69.23%), H.J. Im (USA) (66.67%), D.J. Hunte (27.27%) during 2008-17.
- Ten authors registered the relative citation index more than average (1.98) of all authors: M. Yoshida (Japan) (2.56), D.J. Hunter (USA) (2.45), A. Guermazi (USA) (2.42), T. Akune (Japan), H. Kawaguchi (Japan) and H. Oka (Japan) (2.38 each), S. Muraki (Japan) (2.24), L. Kalichman (USA) (2.13), H.J. Im (USA) (2.12) and N. Yoshimura (Japan) (2.01) during 2008-17.

Medium of Communication

868 journals participated in 1818 journal papers in Spondylosis, of which 808 journals contributed 1 - 5 papers each, 36 journals 6 - 10 papers each, 17 journals 11 - 20 papers and 7 journals 21 - 46 papers. The 15 most productive journals in Spondylosis contributed from 16 to 46 papers and together contributed 19.64% share (357 papers) to the total journal publication output during 2008-17. The publication share of these top 15 most productive journals decreased from 21.26% to 18.38% from 2008-12 to 2013-17. The most productive journal (with 46 papers) was *Osteoarthritis and Cartilage*, followed by *European Spine Journal and Spine* (38 papers each), *Osteoporosis International* (31 papers), *Spine Journal* (24 papers), etc. during 2008-17 (Table 6).

S. No	Name of the Journal	Number of Papers		
		2008-12	2013-17	2008-17
1	*Osteoarthritis and Cartilage*	16	30	46
2	*European Spine Journal*	17	21	38
3	*Spine*	23	15	38
4	*Osteoporosis International*	13	18	31
5	*Spine Journal*	12	12	24
6	*Annals of Rheumatic Diseases*	12	9	21
7	*Journal of Arthoplasty*	5	16	21
8	*BMC Musculoskeletal Disorders*	8	12	20
9	*Clinical Orthopaedics and Related Research*	8	10	18
10	*Skeletal Radiology*	10	8	18
11	*Arthritis and Rheumatism*	15	2	17
12	*Joint Bone Spine*	7	10	17
13	*Bone*	8	8	16
14	*Journal of Rheumatology*	13	3	16
15	*PLOS One*	2	14	16
	Total of 15 Journals	169	188	357
	Total of World	795	1023	1818
	Share of 15 journals in World journal output	21.26	18.38	19.64

Table 6: *List of Top 15 Most Productive Journals in Global Spondylosis Research during 2008-17.*

Highly Cited Papers

There were 64 highly cited papers, which have received citations from 100 to 806 during 2008-17. These 64 highly cited papers together received 11683 citations, leading to average citation per paper of 182.55 Of the 64 highly cited papers, 19 involve the participation of single organization (non-collaborative) and 45 involved the participation of two or more organizations (of which 28 national collabora-

tive and 17 international collaborative). Among international collaborative papers, the largest participation among 18 countries, was with USA (33 papers), followed by U.K. (19 papers), Canada (10 papers), Germany (9 papers), Denmark (7 papers), Australia and Sweden (6 papers each), France (3 papers), Austria, Finland, Netherlands and Switzerland (2 papers each), Argentina, Belgium, Israel, Italy, Norway and Spain (1 paper each). Among 64 highly cited papers, 42 appeared as articles and 6 as conference papers. The 64 highly cited papers involved the participation of 347 authors and 216 organizations. These 64 highly cited papers were published in 27 journals, of which 8 papers were published in *Journal of Bone and Joint Surgery. Series B*, 6 papers each in *Journal of Bone and Joint Surgery. Series A* and *Clinical Orthopaedics and Related Research*, 4 papers in *Acta Orthopaedica*, 3 papers each in *Anesthesiology, Annals of Surgery, British Journal of Anesthesia, Anesthesia and Analgesia* and *Thrombosis Research*, 2 papers each in *Arthroscopy-Journal of Arthroscopic and Related Surgery, Journal of Arthoplasty and The Lancet* and 1 paper each in *Archives of Surgery, Arterosclerois, Thrombosis and Vascular Biology, Arthritis Research and Care, Biomaterials, Blood, BMC Musculoskeletal Disorders, Clinical Pharmacokinetics, Current Opinion in Anesthesiology, Journal of Infection, Osteoarthritis and Cartilage, Orthopaedics and Traumatology: Surgery and Research, Rheumatic Disease Clinic of North America, Regional Anesthesia and Pain Management, Thrombosis and Hemostasis,* and *Transfusion.*

Discussion and Conclusion

1839 global publications on spondylosis research, as indexed in Scopus database, were published during 2008-17 and they increased from 152 to 184 in the year 2008 to the year 2017, registering 4.43% growth per annum. Their cumulative global publication output on spondylosis research increased from 806 to 1033, witnessing 28.16% growth from 2008-12 to 2013-17. The citation impact per paper of global publications on spondylosis research was averaged to 15.44 during 2008-17, however, decreasing from 26.02 during 2008-12 to 7.18 during 2013-17.

The global publication share of the top 10 most productive countries (amongst 82 participating countries) in spondylosis research varied from 3.97% to 32.84% during 2008-17, with highest publication share (32.84%) coming from USA, followed by U.K. (11.69%), Japan (7.94%), Germany and France (5.55% and 5.33%), Germany and France (5.55% and 5.33%), Italy, Canada, China and Australia (from 4.57% to 4.89%) and South Korea (3.97%) during 2008-17. Together these top 10 countries contributed 86.03% of the world output during 2007-16, which increased from 84.62% during 2008-12 to 87.12% during 2013-17 The global publication share increased in China, South Korea, Japan, Germany, Australia and Italy, as against the decrease in USA, UK, Canada and France from 2008-12 to 2013-16. The following six (out of 10 countries) have scored relative citation index more than average of 1.25: Germany (1.65), UK (1.51), USA and France (1.48 each), Canada (1.38) and Australia (1.34) during 2008-17.

Among five broad subjects, medicine contributed the largest publications share of 990.81% to spondylosis research, %), followed by biochemistry, genetics and molecular biology (13.43%), immunology and microbiology (6.63%), neurosciences (6.31%) and pharmacology, toxicology and pharmaceutics (5.33%) during 2008-17. The research activity showed decrease in all subjects, including medicine, biochemistry, genetics and molecular biology, immunology and microbiology, neurosciences and pharmacology, toxicology and pharmaceutics from 2008-12 to 2013-17

Among leading organizations and authors participating in spondylosis research, the 15 most productive global organizations and authors together contributed 18.22% and 11.5% respectively as their share of global publication output and 29.86% and 22.032% respectively as their share of global citation output during 2008-17. The leading organizations in research productivity were: Five organizations have registered higher publications output than the group average of 22.33: Harvard Medical School, USA and University of California, San Francisco, USA (33 papers each), VA Medical Center, USA (28 papers), Rush University, Medical Centre, USA (24 papers) and University of Nottingham, U.K. (23 papers) during 2008-17. The leading organizations in terms of citation impact per paper were: Harvard Medical School, USA (62.58), Kings College, London, U.K. (30.25), University of Tokyo, Japan (28.71) and University of California, San Francisco, USA (25.48) during 2008-17.

The leading authors in publication productivity were: N. Yoshimura (Japan) (18 papers), A. Guermazi (USA) (16 papers), S. Muraki (Japan) (16 papers), T. Akune (Japan), D.J. Hunter (USA), H. Kawaguchi (Japan) and H. Oka (Japan) (15 papers each) during 2008-17. The leading authors in terms of research impact were: M. Yoshida (Japan) (39.55), D.J. Hunter (USA) (37.87), A. Guermazi (USA) (37.44), T. Akune (Japan), H. Kawaguchi (Japan) and H. Oka (Japan) (36.8% each), S. Muraki (34.56), L. Kalichman (USA) (32.92), H.J. Im (USA) (32.67) and N. Yoshimura (Japan) (31.0).

Among the total global journal output of1818 papers in spondylosis research, the top 15 most productive journals contributed 19.64% share of total journal publication output during 2008-17, which decreased from 21.26% to 18.38% from 2008-12 to 2013-17. *Osteoarthritis and Cartilage* was the most productive journals with 46 papers each, followed *European Spine Journal* and *Spine* (38 papers each), *Osteoporosis International* (31 papers), *Spine Journal* (24 papers), etc. during 2008-17.

The top 64 highly cited publications registered citations in the range from 100 to 806 citations per paper and together these top 64 papers cumulated 11683 citations, with an average of 182.55 citations per paper during 2008-17. The largest participation, among 18 countries, was with USA (33 papers), followed by U.K. (19 papers), Canada (10 papers), Germany (9 papers), Denmark (7 papers), Australia and Sweden (6 papers each), France (3 papers), Austria, Finland, Netherlands and Switzerland (2 papers each), Argentina, Belgium, Israel, Italy, Norway and Spain (1 paper each). These 64 highly cited papers resulted from participation of 347 authors and 216 organizations, and were published in 27 journals, including which 8 papers were published in Journal of Bone and Joint Surgery. Series B, 6 papers each in *Journal of Bone and Joint Surgery. Series A* and *Clinical Orthopaedics and Related Research*, 4 papers in *Acta Orthopaedica*, 3 papers each in *Anesthesiology, Annals of Surgery, British Journal of Anesthesia, Anesthesia and Analgesia* and *Thrombosis Research*, 2 papers each in *Arthroscopy-Journal of Arthroscopic and Related Surgery*, *Journal of Arthoplasty* and *The Lancet* and 1 paper each in 12 other journals.

Conclude that Arthritis is the most common cause of disability, and osteoarthritis is our nation's most common form of arthritis. This serious, painful and potentially life-altering joint disease places severe limits on daily activity and quality of life for over million persons. Affecting mainly hands, knees and hips, osteoarthritis (OA) often causes weakness and disability, interferes with work productivity, results in joint replacement and generates inordinate socioeconomic costs. In view of the fact that the population is aging and obesity is on the rise, the prevalence, health impact and economic consequences of OA are expected to increase dramatically. Now is the time for bold and innovative action to reduce the burden of this growing public health issue. A National Public Health Agenda for Osteoarthritis sets the stage for a collaborative and focused initiative to achieve three overall goals over the next three to five years: Ensure the availability of evidence-based intervention strategies, such as self- management education, physical activity, injury prevention, and weight management and healthy nutrition - to all persons with OA. Establish supportive policies, communication initiatives and strategic alliances for OA prevention and management. Initiate needed research to better understand the burden of OA, its risk factors and effective strategies for intervention.

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