



# Rheumatology in India: A Bird's Eye View on Organization, Epidemiology, Training Programs and Publications

Durga Prasanna Misra,<sup>1</sup> Vikas Agarwal,<sup>2</sup> and Vir Singh Negi<sup>1</sup>

<sup>1</sup>Department of Clinical Immunology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India; <sup>2</sup>Department of Clinical Immunology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

Received: 11 January 2016  
Accepted: 4 April 2016

Address for Correspondence:  
Durga Prasanna Misra, DM  
Department of Clinical Immunology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry 605006, India  
E-mail: durgapmisra@gmail.com

India is home to the world's second largest population. Rheumatology is an emerging specialty in India. We reviewed organization, epidemiology and training facilities for Rheumatology in India. Also, we also looked at publications in the field of rheumatology from India from over the past six years using Scopus and Medline databases. Despite rheumatologic disorders affecting 6%–24% of the population, rheumatology in India is still in its infancy. Till recently, there were as few as two centers in the country training less than five fellows per year. However, acute shortage of specialists and increasing patient numbers led to heightened awareness regarding the need to train rheumatologists. Subsequently, six new centers have now started 3-year training programs in rheumatology. The epidemiology of rheumatic diseases in India is being actively studied under the Community Oriented Programme for Control of Rheumatic Diseases (COPCORD) initiative. The most number of publications on rheumatic diseases from India are on rheumatoid arthritis, lupus and osteoporosis, many of which have been widely cited. Major collaborators worldwide are USA, UK and France, whereas those from Asia are Japan, Saudi Arabia and Singapore. The Indian Rheumatology Association (IRA) is the national organization of rheumatologists. The flagship publication of the IRA, the Indian Journal of Rheumatology, is indexed in Scopus and Embase. To conclude, rheumatology in India is an actively expanding and productive field with significant contributions to world literature. There is a need to train more personnel in the subject in India.

**Keywords:** Rheumatology; India; Publications; Epidemiology; Education

## INTRODUCTION

Rheumatology is a sub-specialty of internal medicine dealing with diseases related to musculoskeletal system and systemic perturbations of the immune system. Musculoskeletal problems are responsible for significant morbidity, as evident from the Global Burden of Diseases 2010 study (1,2). This study assessed the burden of 291 diseases worldwide using disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs). Low back pain ranked first in disability (3) amongst all the diseases studied, whereas neck pain (4th) (4), hip and knee OA (11th) (5), rheumatoid arthritis (42nd) (6), gout (138th) (7) and osteoporosis (8) were the other major contributors to disability. Also, osteoporosis was responsible for one-third of deaths related to falls (8). India is home to the second largest population (1,210.2 million as per the 2011 Government of India census data) (9). Rheumatic diseases are a major cause of morbidity in India. The Asia-Pacific League of Associations for Rheumatology (APLAR) is the umbrella organization under which rheumatologists from all over Asia come together annually and share expertise to solve problems pertinent to rheumatic diseases, especially in the context of this region. Under the flagship of the

APLAR, numerous collaborative efforts between India and Korea have resulted in published research, especially in the fields of rheumatoid arthritis, osteoarthritis and osteoporosis.

The issues facing the practice of rheumatology in India have been elucidated in a recent article (10) by Handa, an ex-president of the APLAR. Briefly, lack of adequate manpower and training facilities, staggering costs of therapy and unique problems like burden of infectious diseases challenge adequate management of rheumatic diseases in the country. In our article, we shall focus our discussion on the epidemiology of rheumatic diseases, facilities available to train personnel in rheumatic diseases, publications in rheumatology from 2010 onwards and future directions in the field from an Indian perspective.

## EPIDEMIOLOGY OF RHEUMATIC DISEASES AND TRAINING PROGRAMS IN INDIA

### Search strategy

The search strategy advocated by Gasparyan et al. (11) was adhered to. To infer data regarding epidemiology of rheumatologic diseases in India, we searched the MEDLINE and Scopus databases using the search terms “epidemiology”, “Rheumatic”,

“India” AND “COPCORD”. Additional references were derived from searches on the COPCORD section of the website of the APLAR. Data regarding training programs in rheumatology and clinical immunology in India was derived from searches on the Medical Council of India (MCI) website and the websites of tertiary care centers of national importance (which conduct their own courses outside the purview of the MCI).

### Epidemiology of rheumatic diseases

The first studies to identify rheumatic diseases at a community level emanated from a suburban area near New Delhi in the early 1990s. Under the stewardship of Professor AN Malaviya, the prevalence of musculoskeletal complaints in general, rheumatoid arthritis, spondyloarthropathy (12) and SLE (13) were studied. The first study identified a prevalence of 8.5% for musculoskeletal complaints, amongst more than 44,000 people studied. The most common cause was related to non-specific musculoskeletal complaints (2.07%), followed by osteoarthritis (1.89%). With regards to inflammatory rheumatic diseases, 0.75% had rheumatoid arthritis and 0.36% seronegative spondyloarthropathy (12). The second study screened over 52,000 people for lupus (using both clinical criteria and antinuclear antibodies) and projected a population prevalence of 3 per 100,000 (13).

Further community-based studies on the prevalence of rheumatic disorders have been driven by the Community Oriented Programme for Control of Rheumatic Diseases (COPCORD), which has been borne out of collaboration between the World Health Organization (WHO) and the International League Against Rheumatism (ILAR) (14). The first COPCORD studies in India were started in a rural population in Western India (The Bhigwan Cohort) under the stewardship of Chopra et al. (15) and later expanded to include rural areas in Kerala (16) and subsequently all over the country under the aegis of the Bone and Joint Decade (BJD) (17). These studies provided invaluable information at a community level regarding the burden of musculoskeletal diseases in India. Musculoskeletal pain was prevalent in 6.4%-23.6% of the Indian population (18). The most common causes of impaired quality of life due to musculoskeletal pain were the duration of symptoms, pain in shoulders and hand, and back pain (16). The most prevalent rheumatic problems were non-specific musculoskeletal complaints (4.25%-6.25%), osteoarthritis (4.39%-6.25%, of which knee osteoarthritis comprised 3.34%-4.42%) and soft tissue rheumatism 1.31%-3.77%. Inflammatory rheumatic diseases had a prevalence of less than 1% each (rheumatoid arthritis 0.34%-0.67%, undifferentiated inflammatory arthritis 0.22%-0.76%, spondyloarthritits 0.23%-0.3%, gout 0.04%-0.13% and lupus 0.02%) (17). Interesting data has emerged from the COPCORD initiative at Bhigwan regarding the peculiarity of rheumatic diseases in India. The largest series of musculoskeletal symptoms related to Chikungunya virus infection, comprising 156 patients, has been reported from

this center (19). It is also intriguing to note that the commonest type of juvenile idiopathic arthritis (JIA) prevalent in India, as per the ILAR classification criteria (20) is enthesitis-related arthritis, accounting for more than a third of patients with JIA (21), as opposed to the West where enthesitis-related arthritis accounts for only 10% patients with JIA and instead oligoarticular JIA is the commonest variant (22). There is a need for more community-based studies in India to delineate the similarities and differences of various rheumatic diseases in India compared to the rest of the world.

### Training programs in rheumatology in India

The first exclusive Rheumatology clinic in India was set up at All India Institute of Medical Sciences (AIIMS), New Delhi by Professor AN Malaviya. As per the regulations of the Medical Council of India, sub-specialty training (normally for a period of three years) in rheumatology/clinical immunology is allowed only after completing residency in Medicine or Pediatrics. The first training program (which goes by the name of Doctor of Medicine or DM) in Clinical Immunology was started by Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow. This was followed by the DM program in Rheumatology at Madras Medical College (MMC), Chennai. In 2005, there were less than 5 DM seats in India for Rheumatology or Clinical Immunology training. As of today, 22 fellows are trained every year in DM courses run at 8 different institutions in the country [DM Rheumatology: 12, MMC – 4, Nizam's Institute of Medical Sciences (NIMS), Hyderabad – 3, King George Medical University (KGMU), Lucknow – 2, Institute of Postgraduate Medical Education and Research (IPGMER), Kolkata – 2, Christian Medical College (CMC), Vellore – 1]; DM Clinical Immunology: 6, SGPGIMS – 4, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry – 2; DM Rheumatology and Clinical Immunology: Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh – 3; DM Pediatric Rheumatology and Clinical Immunology: PGIMER – 1] (23-25). Separate training for Pediatric Rheumatology exists only in one center i.e. PGIMER, Chandigarh. Also, the National Board of Medical Examinations offers the degree of Diplomate of the National Board (DNB) in Rheumatology (4 per year). A significant proportion of specialists catering to patients with rheumatic diseases have been trained abroad. In a country with a population exceeding 1.2 billion, training 26 doctors in Rheumatology every year is grossly inadequate to cater to the ever-expanding population. There is an urgent need to train more doctors in the specialty to cater to the needs of the population. Considering that 2,368 doctors complete residency in Internal Medicine and 1,209 doctors complete residency in Pediatrics every year, training 26 fellows in the sub-specialty of Rheumatology every year is grossly inadequate (especially when compared to other sub-specialties – e.g. 282 fellows in Cardiology

and 175 fellows in Neurology every year) (23). Given the immense need for trained persons to cater to the enormous burden of rheumatologic disorders in India, it is essential to have a rheumatology or clinical immunology department/unit in every medical college (government or private) in the country.

**PUBLICATIONS IN RHEUMATOLOGY FROM INDIA**

**Search strategy**

Fig. 1 summarizes the search strategy used (11). Data regarding publications from India in rheumatic diseases was derived from searches on the Scopus database (which also includes all the data from MEDLINE) by searching the article title, abstracts and keywords using the following search words: “rheumatoid arthritis”, “spondyloarthritis”, “ankylosing spondylitis”, “reactive arthritis”, “psoriatic arthritis”, “enteropathic arthritis”, “lupus”, “systemic lupus erythematosus”, “SLE”, “Sjogren”, Sjogren’s syndrome”, “vasculitis”, “Takayasu”, “Kawasaki”, “ANCA”, “dermatomyositis”, “polymyositis”, “inclusion body myositis”, “idiopathic inflammatory myositis”, “osteoarthritis”, “osteoporosis”, “systemic sclerosis”, “scleroderma”, “mixed connective tissue disease”, “MCTD”, “juvenile idiopathic arthritis”, “enthesitis related arthritis”, “oligoarticular JIA”, “polyarticular JIA”, “infective arthritis”, “chikungunya arthritis”, “tuberculous arthritis”, “leprosy arthritis”, “fibromyalgia”, “complementary and alternative medicines”, “ayurveda”, “siddha”, “homeopathy”, “unani”. Searches were limited from 01 January 2010 to 22 October 2015 to include recent

publications. These publications were analyzed with respect to number of publications, number of citations, h-index, year of publication, type of article, institutions with highest number of published papers and collaborative efforts, both worldwide and regional.

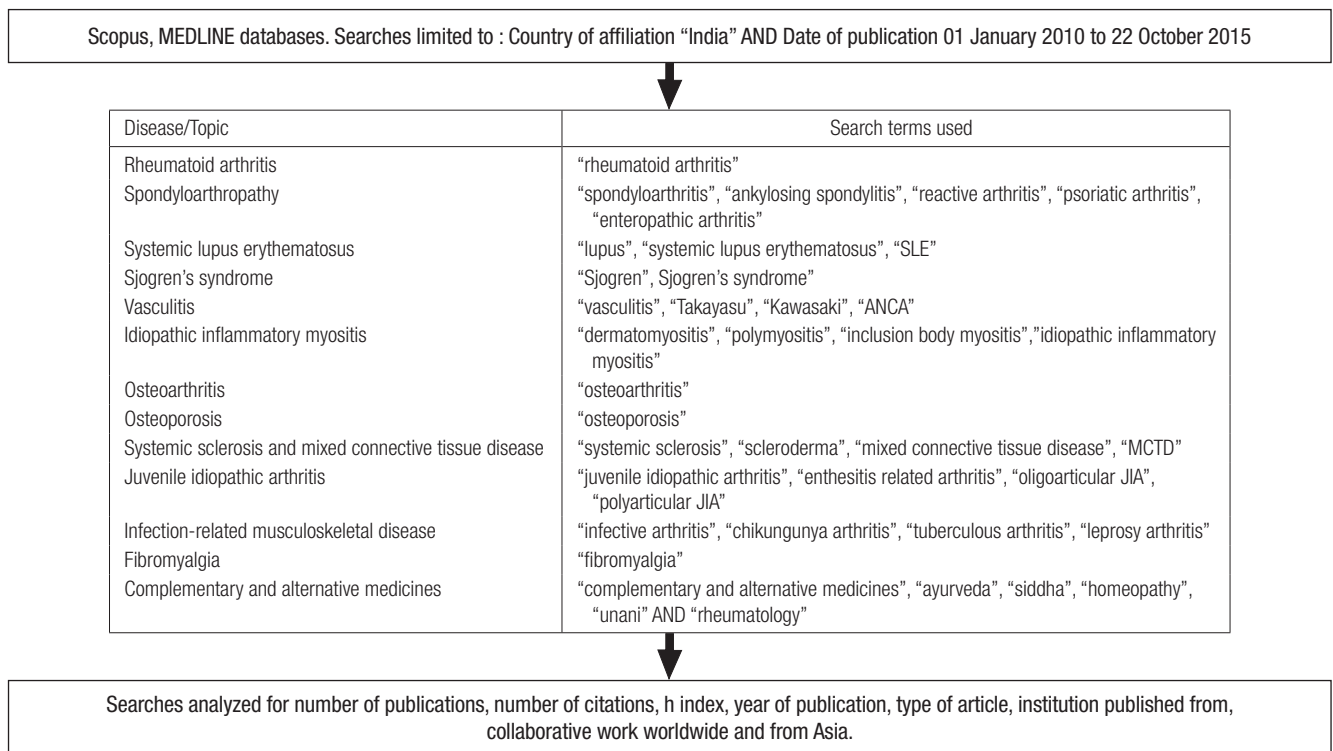
**Publications in rheumatology from India**

Table 1 summarizes the number of publications and citations in different rheumatic diseases. The h-index (26) (named after

**Table 1.** Summary of publications in different diseases in Rheumatology from India between 2010-2015

Disease/Topic	No. of publications	No. of citations	h-index
Rheumatoid arthritis	1,403	6,607	29
Spondyloarthropathy	437	1,644	17
Systemic lupus erythematosus	905	3,634	23
Sjogren’s syndrome	82	174	6
Vasculitis	717	2,069	19
Idiopathic inflammatory myositis	129	1,097	9
Osteoarthritis	655	2,583	23
Osteoporosis	846	4,394	26
Systemic sclerosis and mixed connective tissue disease	236	895	20
Juvenile idiopathic arthritis	88	413	11
Infection-related musculoskeletal disease	197	857	15
Fibromyalgia	79	547	12
Complementary and alternative medicines	10	57	4

Databases searched: Scopus, MEDLINE. Publications between 01 January 2010 and 22 October 2015 were analyzed.



**Fig. 1.** Search strategy for analysis of publications from India in the field of rheumatology.

**Table 2.** Analysis of published articles in rheumatology from India (2010-2015) by year of publication

Disease/Topic	Total No. of articles	2010	2011	2012	2013	2014	2015
Rheumatoid arthritis	1,403	186	262	269	271	250	165
Spondyloarthropathy	437	44	78	67	103	84	61
Systemic lupus erythematosus	905	122	153	168	173	150	139
Sjogren's syndrome	82	12	13	19	13	12	13
Vasculitis	717	93	113	122	162	144	83
Idiopathic inflammatory myositis	129	14	27	24	25	24	15
Osteoarthritis	655	77	118	104	134	124	98
Osteoporosis	846	101	156	159	196	123	111
Systemic sclerosis and mixed connective tissue disease	236	36	36	40	53	41	30
Juvenile idiopathic arthritis	88	13	11	18	19	21	6
Infection-related musculoskeletal disease	197	29	57	36	35	27	13
Fibromyalgia	79	10	14	20	14	17	4
Complementary and alternative medicines	10	0	2	1	4	1	2

Databases searched: Scopus, MEDLINE. Publications between 01 January 2010 and 22 October 2015 were analyzed.

**Table 3.** Distribution of published articles in Rheumatology from India (2010-2015) by type of article

Disease/Topic	Total No. of articles	Percentage of articles	Percentage of reviews	Percentage of book chapters	Percentage of editorials
Rheumatoid arthritis	1,403	66	22	0.4	2
Spondyloarthropathy	437	71	17	0.2	2
Systemic lupus erythematosus	905	65	17	0.5	2
Sjogren's syndrome	82	70	11	0	0
Vasculitis	717	70	17	0.5	1
Idiopathic inflammatory myositis	129	58	19	0	2
Osteoarthritis	655	72	17	1	1
Osteoporosis	846	67	21	0.2	2
Systemic sclerosis and mixed connective tissue disease	236	61	16	0	2
Juvenile idiopathic arthritis	88	78	10	0	1
Infection-related musculoskeletal disease	197	68	24	0	1
Fibromyalgia	79	51	29	1	4
Complementary and alternative medicines	10	80	10	10	0

Databases searched: Scopus, MEDLINE. Publications between 01 January 2010 and 22 October 2015 were analyzed.

Jorge Hirsch, the scientist who proposed this metric) is a measure of the citability of an author, journal or group of articles. An h-index of n implies that, for a particular author, journal or group of articles, n articles have been cited at least n number of times in databases such as Google Scholar and Web of Science. Our search revealed that overall, rheumatoid arthritis, systemic lupus erythematosus and osteoporosis were the three areas with the highest number of publications, and also comprised the highest numbers of citations. The h-index was highest for rheumatoid arthritis (29), followed by osteoporosis (26), systemic lupus erythematosus and osteoporosis (23 each). Table 2 summarizes the number of publications in each of the years from 2010 to 2015. The number of publications remained similar in each year across different diseases. Table 3 summarizes the types of publications. Articles (original or case reports) comprised 51%-80%, review articles 10%-29%, book chapters 0%-10% and editorials 0%-4% each in the different subject areas.

India is a vast country with different ethnic backgrounds in different areas. For this reason (using the same strategy and search of Scopus and MEDLINE database as described above),

we chose to analyze data regarding publishing activities of institutions by dividing India into Eastern India (Bihar, West Bengal, Odisha, North-Eastern states), Western India (Maharashtra, Goa, Gujarat and Rajasthan), North and Central India (Madhya Pradesh, Chattisgarh, Delhi, Uttarakhand, Haryana, Punjab, Jammu and Kashmir) and South India (Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and Puducherry). Overall, the institution with most publications across specialties for the whole country as well as for North and Central India was Postgraduate Institute of Medical Education and Research, Chandigarh. The most published institutions from other parts of India were Christian Medical College, Vellore from South India, Institute of Postgraduate Medical Education and Research, Kolkata from Eastern India and King Edward Medical College, Mumbai from Western India.

Table 4 summarizes research publications culminating from collaborative research with Indian rheumatologists. Worldwide, the top three collaborating nations were the United States of America, the United Kingdom and France. From Asia, the top three collaborators were Japan, Saudi Arabia and Singapore.

**Table 4.** Top three collaborating nations with respect to research publications from India in Rheumatology (2010-2015) worldwide and from Asia

Disease/Topic	Top three collaborating countries	Top three collaborating Asian countries
Rheumatoid arthritis	USA, UK, France	Japan, Singapore, South Korea
Spondyloarthropathy	USA, UK, Canada	Saudi Arabia, Iran, Japan
Systemic lupus erythematosus	USA, UK, France	Saudi Arabia, Malaysia, Hong Kong, Singapore, Turkey
Sjogren's syndrome	USA, Japan, Argentina	Japan, China, Saudi Arabia
Vasculitis	USA, UK, France	Japan, Saudi Arabia, Turkey
Idiopathic inflammatory myositis	USA, France, UK	Israel, Japan, Saudi Arabia, Turkey, China
Osteoarthritis	USA, Germany, South Korea	South Korea, Saudi Arabia, Iran, Japan
Osteoporosis	USA, UK, Canada	Japan, Saudi Arabia, South Korea
Systemic sclerosis and mixed connective tissue disease	USA, Canada, UK	Saudi Arabia, Iran, China, Japan, Egypt, Israel, Singapore, Turkey
Juvenile idiopathic arthritis	USA, Germany, UK	Japan, Israel, Turkey
Infection-related musculoskeletal disease	UK, USA, Bangladesh	Bangladesh, Nepal, Phillipines, Qatar, Singapore
Fibromyalgia	USA, Italy, UK	Israel, Malaysia, Singapore
Complementary and alternative medicines	USA, Germany, Italy, New Zealand	-

USA, United States of America; UK, United Kingdom.

Databases searched: Scopus, MEDLINE. Publications between 01 January 2010 and 22 October 2015 were analyzed.

Collaborations between Korean and Indian scientists resulting in published papers were mostly in the subject areas of rheumatoid arthritis, osteoarthritis and osteoporosis. We could not find any retractions from India in the field of Rheumatology.

## NATIONAL ASSOCIATION

The Indian Rheumatology Association (IRA) is the national association of Rheumatologists in India (27). It has more than 1,100 members. The IRA is a member of the Asia Pacific League of Associations for Rheumatology (APLAR). It has numerous associations at the level of the states under its purview. It organizes the annual national meeting [Indian Rheumatology Association Conference (IRACON)] and multiple continuing medical education (CME) programs throughout the year in different parts of the country. The IRA organized the APLAR 2015 international conference in Chennai in September 2015. The association promotes the interest of young doctors in rheumatology by organizing the annual Quiz for Postgraduates in medicine and an annual quiz program for fellows-in-training. Every year, the IRA awards three prestigious orations; the Zydus Oration, the Kolkon Oration and the IRA Oration to honor researchers in this field. It also awards the MN Passey Award for Distinguished Services to a senior rheumatologist in the country every year. Every year, the best papers and posters (both Basic Science and Clinical), and the best research paper from overseas are bestowed the IRA Young Investigator Awards at the IRACON. The IRA provides ten travel bursaries to enable meritorious young doctors to attend the IRACON. The IRA also provides a travel grant to attend the APLAR conference. It also awards the Indo-UK fellowship to enable meritorious young rheumatologists to attend the British Society for Rheumatology (BSR) annual conference and experience a short period of training in the United Kingdom.

The Indian Journal of Rheumatology is the flagship publication of the IRA which is indexed in Scopus and Embase and pub-

lished quarterly along with two to three yearly supplements featuring articles from leaders in the field of Rheumatology both from India and abroad. The journal has an h-index of 6 (28). The journal is peer-reviewed and published online in a timely fashion, with ethical editorial policies following international editorial conventions, full-text English articles freely accessible via the website in electronic formats including the pdf format. The journal represents the interests of rheumatologists not only from India, but also from abroad, and articles published in the journal are often cited. The present editorial board is diverse, including notable experts in rheumatic diseases both from India and around the world. For these reasons, we are of the opinion that, although not currently indexed in the Emerging Sources Citation Index (29) and Medline (30) databases, the prospects for indexing in these databases are encouraging in the coming years. The IRA also publishes the Manual of Rheumatology which serves as a learning resource to guide young rheumatologists. The only other journal in this specialty published from India is the Internet Journal of Rheumatology and Clinical Immunology, an open-access journal without any publishing fees, indexed in Index Medicus South East Asia Region.

## FUTURE PERSPECTIVES

Rheumatology in India is still a budding specialty, and it is faced with enormous challenge of providing services to the enormous burden of rheumatic diseases in the population. There is a need for more community-based studies to assess the exact burden of different rheumatic disease as well as understand the felt needs of the patients in the community. The COPCORD initiative is a worthwhile model for the same and needs to be replicated across the country. It will help in formulating multiple level strategies to meet this challenge. There is an urgent need to train more rheumatologists from India to cater to the growing populace. Short term training courses (6-12 months) for existing faculty



members in Medicine and Pediatrics in Medical colleges may be one of the first steps in the right direction. Such training programs should aim not only to train doctors, but also paramedical staff such as specialist nurses, who can share the growing burden of rheumatologists as well as dispense basic services both in the community and hospitals such as monitoring of investigations, performing joint counts and filling standardized indices. In spite of these limitations, rheumatologists from India continue to publish numerous papers in different fields, which are widely cited in world literature. There is a need to enhance collaborative research both nationally and internationally. Considering the scope for improvement in Rheumatology services across the country and the continual efforts to do the same, the future of this field appears bright indeed.

## DISCLOSURE

The authors have no potential conflicts of interest to disclose.

## AUTHOR CONTRIBUTION

Study conception and design: Misra DP, Agarwal V, Negi VS. Data acquisition: Misra DP, Agarwal V, Negi VS. Analysis and interpretation of the data: Misra DP, Agarwal V, Negi VS. Writing manuscript: Misra DP. Critical revision: Agarwal V, Negi VS. Final approval of manuscript submission: all authors.

## ORCID

Durga Prasanna Misra <http://orcid.org/0000-0002-5035-7396>

Vikas Agarwal <http://orcid.org/0000-0002-4508-1233>

Vir Singh Negi <http://orcid.org/0000-0003-1518-6031>

## REFERENCES

- Murray CJ, Lopez AD. Measuring the global burden of disease. *N Engl J Med* 2013; 369: 448-57.
- Storheim K, Zwart JA. Musculoskeletal disorders and the global burden of disease study. *Ann Rheum Dis* 2014; 73: 949-50.
- Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, Williams G, Smith E, Vos T, Barendregt J, et al. The global burden of low back pain: estimates from the global burden of disease 2010 study. *Ann Rheum Dis* 2014; 73: 968-74.
- Hoy D, March L, Woolf A, Blyth F, Brooks P, Smith E, Vos T, Barendregt J, Blore J, Murray C, et al. The global burden of neck pain: estimates from the global burden of disease 2010 study. *Ann Rheum Dis* 2014; 73: 1309-15.
- Cross M, Smith E, Hoy D, Nolte S, Ackerman I, Fransen M, Bridgett L, Williams S, Guillemin F, Hill CL, et al. The global burden of hip and knee osteoarthritis: estimates from the global burden of disease 2010 study. *Ann Rheum Dis* 2014; 73: 1323-30.
- Cross M, Smith E, Hoy D, Carmona L, Wolfe F, Vos T, Williams B, Gabriel S, Lassere M, Johns N, et al. The global burden of rheumatoid arthritis: estimates from the global burden of disease 2010 study. *Ann Rheum Dis* 2014; 73: 1316-22.
- Smith E, Hoy D, Cross M, Merriman TR, Vos T, Buchbinder R, Woolf A, March L. The global burden of gout: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis* 2014; 73: 1470-6.
- Sánchez-Riera L, Carnahan E, Vos T, Veerman L, Norman R, Lim SS, Hoy D, Smith E, Wilson N, Nolla JM, et al. The global burden attributable to low bone mineral density. *Ann Rheum Dis* 2014; 73: 1635-45.
- Ministry of Home Affairs (IN). National summary data page (NSDP) [Internet]. Available at [http://www.censusindia.gov.in/Census\\_Data\\_2001/National\\_Summary/National\\_Summary\\_DataPage.aspx/](http://www.censusindia.gov.in/Census_Data_2001/National_Summary/National_Summary_DataPage.aspx/) [accessed on 26 November 2015].
- Handa R. Rheumatology in India--quo vadis? *Nat Rev Rheumatol* 2015; 11: 183-8.
- Gasparyan AY, Ayvazyan L, Blackmore H, Kitas GD. Writing a narrative biomedical review: considerations for authors, peer reviewers, and editors. *Rheumatol Int* 2011; 31: 1409-17.
- Malaviya AN, Kapoor SK, Singh RR, Kumar A, Pande I. Prevalence of rheumatoid arthritis in the adult Indian population. *Rheumatol Int* 1993; 13: 131-4.
- Malaviya AN, Singh RR, Singh YN, Kapoor SK, Kumar A. Prevalence of systemic lupus erythematosus in India. *Lupus* 1993; 2: 115-8.
- Chopra A. COPCORD--an unrecognized fountainhead of community rheumatology in developing countries. *J Rheumatol* 2004; 31: 2320-2.
- Chopra A, Patil J, Billempelly V, Relwani J, Tandle HS; WHO-ILAR COPCORD Study. WHO International League of Associations from Rheumatology Community Oriented Program from Control of Rheumatic Diseases. Prevalence of rheumatic diseases in a rural population in western India: a WHO-ILAR COPCORD Study. *J Assoc Physicians India* 2001; 49: 240-6.
- Mathew AJ, Chopra A, Thekkemuriyil DV, George E, Goyal V, Nair JB; Trivandrum COPCORD Study Group. Impact of musculoskeletal pain on physical function and health-related quality of life in a rural community in south India: a WHO-ILAR-COPCORD-BJD India study. *Clin Rheumatol* 2011; 30: 1491-7.
- Chopra A. Disease burden of rheumatic diseases in India: COPCORD perspective. *Indian J Rheumatol* 2015; 10: 70-7.
- Chopra A. The COPCORD world of musculoskeletal pain and arthritis. *Rheumatology (Oxford)* 2013; 52: 1925-8.
- Chopra A, Anuradha V, Lagoo-Joshi V, Kunjir V, Salvi S, Saluja M. Chikungunya virus aches and pains: an emerging challenge. *Arthritis Rheum* 2008; 58: 2921-2.
- Petty RE, Southwood TR, Manners P, Baum J, Glass DN, Goldenberg J, He X, Maldonado-Cocco J, Orozco-Alcala J, Prieur AM, et al. International League of Associations for Rheumatology classification of juvenile idiopathic arthritis: second revision, Edmonton, 2001. *J Rheumatol* 2004; 31: 390-2.
- Kunjir V, Venugopalan A, Chopra A. Profile of Indian patients with juvenile onset chronic inflammatory joint disease using the ILAR classification criteria for JIA: a community-based cohort study. *J Rheumatol* 2010; 37: 1756-62.
- Oen K, Tucker L, Huber AM, Miettunen P, Succimarri R, Campillo S, Cabral DA, Feldman BM, Tse S, Chédeville G, et al. Predictors of early inactive disease in a juvenile idiopathic arthritis cohort: results of a Canadian

- multicenter, prospective inception cohort study. *Arthritis Rheum* 2009; 61: 1077-86.
23. Medical Council of India. Courses available in different specialities as per the Medical Council of India [Internet]. Available at <http://www.mciindia.org/InformationDesk/CollegesCoursesSearch.aspx> [accessed on 22 November 2015].
24. Courses available at JIPMER, Puducherry [Internet]. Available at [http://jipmer.edu.in/wp-content/uploads/2012/09/JIPMER-Website\\_Course.pdf](http://jipmer.edu.in/wp-content/uploads/2012/09/JIPMER-Website_Course.pdf) [accessed on 22 November 2015].
25. Postgraduate Institute of Medical Education and Research Chandigarh (IN). Courses available at PGIMER, Chandigarh [Internet]. Available at [http://pgimer.edu.in/PGIMER\\_PORTAL/PGIMERPORTAL/home.jsp](http://pgimer.edu.in/PGIMER_PORTAL/PGIMERPORTAL/home.jsp) [accessed on 22 November 2015].
26. Bornmann L, Marx W, Gasparyan AY, Kitas GD. Diversity, value and limitations of the journal impact factor and alternative metrics. *Rheumatol Int* 2012; 32: 1861-7.
27. Indian Rheumatology Association [Internet]. Available at <http://www.indianrheumatology.org/aboutus.html/> [accessed on 6 December 2015].
28. SCImago journal and country rank [Internet]. Available at <http://www.scimagojr.com/journalsearch.php?q=10700153304&tip=sid&clean=0/> [accessed on 10 March 2016].
29. Thomson Reuters. Indexing in emerging sources citation index [Internet]. Available at <http://wokinfo.com/essays/journal-selection-process/> [accessed on 15 February 2016].
30. U.S. National Library of Medicine. Indexing in Medline. Available at [https://www.nlm.nih.gov/pubs/factsheets/j\\_sel\\_faq.html](https://www.nlm.nih.gov/pubs/factsheets/j_sel_faq.html) [accessed on 15 February 2016].