

RHEUMATOLOGY: MADE IN INDIA**(Camps, COPCORD, HLA, Ayurveda, HAQ, WOMAC and Drug Trials)****Arvind Chopra**

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Abstract:

This coveted oration describes my clinical and research career. The focus is on 'Indian-ness' and contributions to Indian Rheumatology.

Methods: This oration will focus on clinical profile, camps, HAQ, Community oriented program for control of rheumatic diseases (COPCORD) Bhigwan, Ayurveda, drug trials, ANA, HLA, BJD, New Millennium Indian Technology Leadership Initiative (NMITLI), MAI, database & CRD.

Results: The clinical profile of Indian arthritides is different and Caucasian population based classification criteria do not suffice. Comparative data from free arthritis camps is presented. Validated versions of HAQ and WOMAC suitable for Indian use were developed and are presented. The maiden Indian WHO COPCORD, an ongoing rural population program in Bhigwan (Pune), has provided statistics on prevalence, incidence, risk factors. The Bhigwan model, unlike any other COPCORD, provides free clinical services. The Bhigwan longitudinal observational seven year data from RA patients (unpublished) showed that (i) regular DMARD use had lower HAQ scores (better functional ability) (ii) chloroquin was safe (iii) steroids had higher HAQ scores. The HLA DR. profile in RA, both from Bhigwan and hospital referrals, was remarkably different. We have demonstrated the efficacy and safety of certain standardized Ayurvedic drugs in RA and OA knees through several controlled randomized drug trials; one of these drugs is now marketed worldwide. These trials also showed an unprecedented robust placebo response. A multicentric NMITLI arthritis program, funded by Government of India, has been launched to identify evidence based Ayurvedic medicinal plants and will be co-ordinated from CRD, Pune. The Bone and Joint Decade (BJD) 2000-2010 India program, also run from CRD, has launched several national research programs.

Conclusion: As clinicians, we can do significant research, especially pertaining to community needs. Arthritis camps are useful. But we also need population studies such the WHO COPCORD Bhigwan. BJD has begun to measure the national disease burden. Ayurvedic medicines can treat arthritis and need further scientific exploration. Rheumatology needs to be recognized both as a specialty and a research area.

Key words: Ayurveda, BJD, Clinical Research, COPCORD, Drug Trials, Epidemiology, Quality of Life, Rheumatology

I thank the Indian Rheumatology Association for awarding me the IRACON AVENTIS Oration 2003. My oration title is rather unconventional but the aim is to stir 'Indian-ness' in our specialty. I shall focus on the scientific aspects of my work related to clinical

and laboratory studies in patients with rheumatic diseases. Clinical studies include profile of patients with rheumatic complaints in hospital and community (camps), COPCORD (Community oriented program for control of rheumatic diseases) Bhigwan, validation of HAQ (Health Assessment Questionnaire- for RA) and WOMAC (Western Ontario McMaster's University, an OA Index), Ayurvedic drug trials. Lab studies include ANA and HLA. I shall take this opportunity activity to introduce The Bone and Joint Decade

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(BJD) and the New Millennium Indian Technology Leadership Initiative (NMITLI).

1981-1989:

Clinical Profile:

In 1980, I joined Armed Forces Medical College (AFMC), Pune, for my post-graduation in general medicine. Brig AR Subramanian, the then Head of the Department of Medicine and my guide allotted me “A study of polyarthritides” for my MD desertation. Evaluation of 50 patients suffering from chronic polyarthritides¹ was a fascinating exercise with observation of some diseases that we rarely see now syphilis, Jaccoud’s arthritis, and infective polyarthritis^{2,3,4}. A lower prevalence of rheumatoid factor was observed in Rheumatoid arthritis⁵. The prevalence of RA in the young servicemen population was reported to be 0.06%. An overlap between RA and SSA (seronegative spondarthritis) in several young servicemen was observed. Caucasian population based criteria were not suitable for our community⁶. The concurrent presence⁷ (Table 1) of RF and B27 led some credence to my

Table 1: Incidence of HLA B27 in Servicemen with chronic inflammatory arthritis

Patients	RA(+)	RA(-)	Total RA	Unclassifiable
Number Tested	9	2	11	5
Number B 27 positive	4	1	5	3

Note: (+):RF positive; (-): RF negative

earlier observation of RA-SSA overlap. The frequency of B27 in the servicemen cohort (Table 2) was compared that from other Indian and Caucasian data⁸. The Association of Physicians of India awarded Dr Berry Memorial Award 1987 and E Merck Award 1988 to our research presentations^{7,8}.

Table 2: Frequency and relative risk of B27 locus antigen in SSA

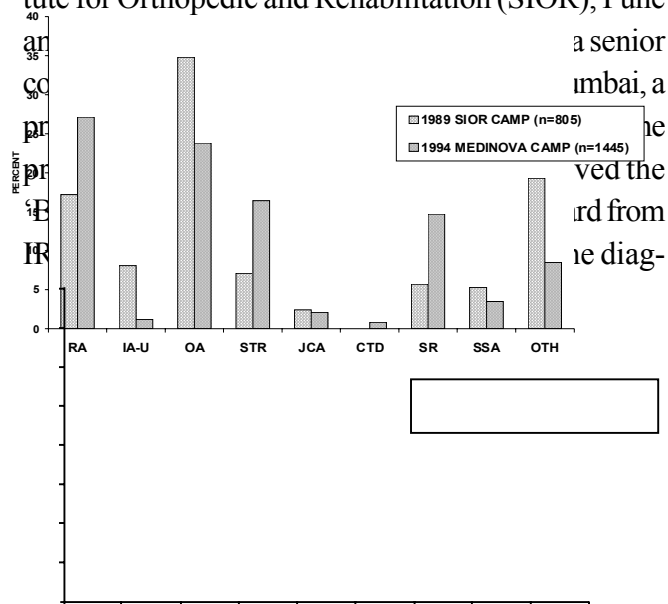
Subset	Present study		AIIMS, Delhi		Caucasians	
	f	R	f	R	f	R
AS	73	26	92	193	90-100	90-118
RS	67	20	80	66	65-100	17-40
SSA-U	41	7	84	83		
Reactive Arthritis	-	-	-	-	60-70	18
Controls	9		6	9		

Note: f: frequency percent ; R: relative risk; AS: Ankylosing Spondylitis; RS:Reiter’s Syndrome; SSA-U: Seronegative Spondarthritis Undifferentiated.

1990-1999:

Arthritis Camps:

The socio-economic viability of medical camps was appealing. Under guidance of Dr KH Sancheti, Director and Chief orthopedic surgeon, Sancheti Institute for Orthopedic and Rehabilitation (SIOR), Pune



RA: Rheumatoid factor; IA-U: Inflammatory arthritis; OA: Osteoarthritis; STR: Soft Tissue Rheumatism; JCA: Juvenile chronic arthritis; CTD: Connective tissue disease; SR: Symptom related; SSA: Seronegative Spondyloarthropathy, OTH: Others.

Figure 1 : Arthritis Camps : Percent distribution of patients classified in to major disease category

nostic break-up (percent) of the patients seen in the two camp series with different background. The 1989 data⁹ was collected from 8 camps, held monthly, in SIOR with free clinical services and subsidized investigations. The 1994 data (unpublished) was collected from 26 camps, held every 2-3 weeks, at another center, Medinova, Pune; with free of cost clinical and lab services. These camps provide good platform for public education¹⁰ and provide useful clinical data but cannot replace population based studies.

Fellowship:

I completed a three month advanced APLAR training fellowship in the Dept of Rheumatology, The St George Hospital, Sydney, Australia, in 1992 under the supervision of Prof John Edmonds. He initiated me into community research. On return to Pune, I organized a rheumatology team and the 'Center for Rheumatic Diseases' (CRD).

HAQ (Health Assessment Questionnaire):

The HAQ^{11,12} brought back into focus issues connected with 'quality of life' and 'disability'. It was realized that the HAQ would have to be modified in the Indian setting. Both the community and the patients were interviewed and surveyed to obtain data and views on the critical functional elements related to our habits and traditional life styles (e.g. sitting cross legged on the floor) for the Indian HAQ. A HAQ research team, with suitable community and patient representation, to finalize the Indian version through a consensus approach was established. It was ensured that the basic concept and structure of the Stanford HAQ was not lost during the several cross cultural adaptations and language translations. Finally, reinforced with validation statistics, the Indian HAQ^{13,14} (see Appendix A) came into being. The instrument was presented for the first time

in the national conference of the Indian Rheumatology Association in 1992. Till date, HAQ continues to be an essential component of our rheumatology assessment, be it referral practice, drug trials, arthritis camps or the WHO COPCORD Bhigwan¹⁵.

Laboratory :

I was inspired by the study of Malaviya et al to determine the lupus population prevalence¹⁶ using filter paper blood clots (FPBC) collected during an urban malaria survey. Using FPBC, a pilot study¹⁷ was carried out to validate the ANA detection using color enzymes instead of the gold standard immunofluorescent (IF) technique. Color enzyme patterns are visualized under light microscope. The technique was fine tuned subsequently¹⁸, to enhance its sensitivity and specificity. HLA DR typing in patients with RA was done with collaboration of Prof John Edmonds (Australia) and Prof Alan Silman (UK) both from referral practice¹⁹ and the COPCORD rural population²⁰. An ongoing program to collect classification and HLA data in juvenile inflammatory arthritis²¹ is underway.

Ayurveda:

Prof B Patwardhan, Director, School of Health Sciences, Pune University, initiated a project in early 90s to validate alternative medicinal systems through an interdisciplinary approach. I joined this nascent beginning and later termed it as the 'modern medicine-Ayurveda interface'. This was an opportunity to learn Ayurveda and its rheumatology. We began to explore anti-arthritic Ayurvedic herbal mineral formulations. One such drug that was named RA-1 and later developed into RA-11. Bioved, an American herbal research start up company, decided to sponsor further clinical validation of this drug. A protocol was developed for evaluation of this drug in collaboration with Prof R Polisson,

Faculty, Harvard Medical School, at the Arthritis Unit of Massachusetts General Hospital, Boston. A 16 week randomized, double blind, placebo controlled, parallel efficacy clinical drug trial study to evaluate RA-1 in patients with RA. The randomized phase of 182 patients was followed by a year long open label phase; almost one-third patients were evaluated at five year follow-up. The RA-1 trial was published¹⁴ with an editorial²² commending the work and highlighting an integrated approach towards alternative and complementary medicines. Recently, a systematic analysis reviewed this trial²³. The Indian modification of the WOMAC index for OA was validated (Appendix B) for OA hips and knees and used it to evaluate efficacy of RA 11 in OA knees²⁴. The result of the Ayurvedic drug trials were presented at the ACR meetings^{25,26}. RA-1/11 is now marketed Worldwide (in India by Dabur under the trade name of Artrex) . Ayurveda needs to be understand in the context of modern medicine^{27,28,29} with particular reference to rheumatology. An overview of Ayurveda therapeutics on the American College of Physician’s PIER website³⁰ was posted by me.

Increased placebo response :

A robust placebo response was observed in our patients from randomized controlled drug trial studies. Fig 2 & 3 demonstrates a significant placebo effect in patients with active RA from RA-1 study¹⁴ and a recently completed SIRO trial (unpublished). The ‘percent change from baseline’ with respect to the joint count for swelling and HAQ is being shown. The joint count for swelling and HAQ are amongst the ACR core set efficacy measures³¹ for drug trials in RA. However, ACR 20³² can differentiate an active drug response from that of the placebo, as shown in Fig 4. The data on leflunomide (unpublished) in Fig 4 is derived from

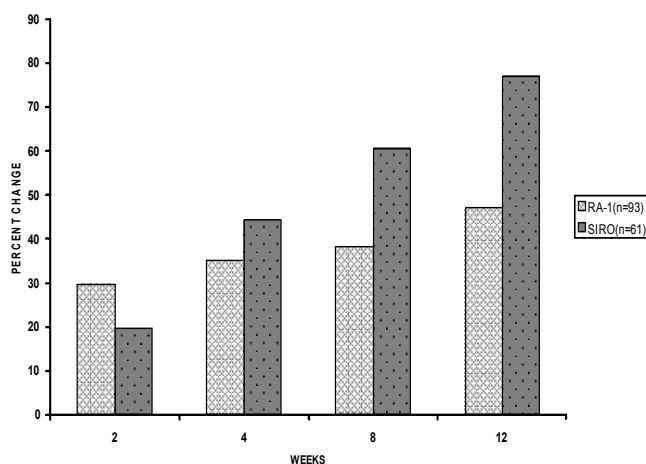


Figure 2 : Percent change from Baseline in the joint count for swelling in the placebo group from two randomized controlled drug trial studies over time (weeks)

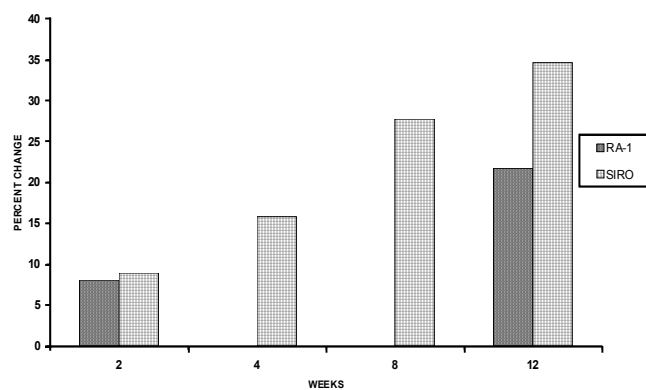


Figure 3 : Percent change from Baseline in HAQ in the placebo group from two randomized controlled drug trial studies over time (weeks)

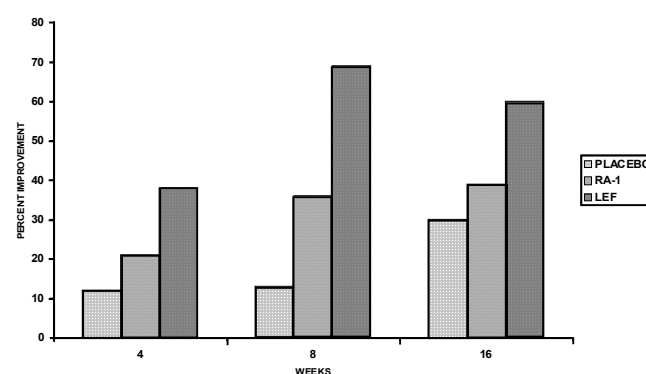


Figure 4 : ACR 20 improvement in patients (percent) of RA by placebo, RA-11, & Leflunomide over time (weeks)

the referral clinical practice in CRD, Pune. However, there was an almost 30% ACR 20 improvement response in the placebo group at week 16 (Fig 4). There are several reasons¹⁴ for the strong placebo response due to over caring attitudes of the investigator to the cultural and traditional belief of an Indian patient in the doctor .

Besides carrying out several drug trials on anti-arthritic Ayurvedic medicines, we have carried out controlled evaluations of the COX-2 inhibitors^{33,34}.

COPCORD (Community oriented program for control of rheumatic diseases):

Population studies are uncommon in our setting largely because of economics and logistics. The maiden Indian rural population based WHO-ILAR COPCORD³⁵ was launched in Bhigwan in Feb 96 and is the only program of it’s kind in the World that has continued till date. It has been a novel experiment in community rheumatology. Beyond the one time COPCORD population survey rhetoric, the Bhigwan program has fulfilled the long term COPCORD objectives (identifying risk factors, health education and preventive strategies) and provided free clinical services, including medicines and assist devices for the needy, to the community at large. Today, COPCORD Bhigwan provides cover to about 40,000 rural population spread over 120 villages or so. Prof HA Valkenburg, The Netherlands, a distinguished epidemiologist & founder of the WHO-ILAR COPCORD, wrote in his official report “Remarkable that the whole data sampling (of COPCORD Bhigwan) could take place in 5 weeks time as the result of a very well prepared and punctually executed organization in which apparently all team members actively and enthusiastically participated. The survey itself was an amazingly well oiled, concentrated and highly organized operation in which the local medi-

cal community participated”. The COPCORD Bhigwan data has been presented and published several times^{36,37,38}. Yet, it gets misinterpreted in important reviews³⁹ with a mix up of prevalence & proportion statistics.

The prevalence of RA (ACR classified) in rural Bhigwan was reported to be strikingly high³⁷. Some new data that are unpublished on the long term evaluation of these RA patients are being presented using the CRD Pune HAQ (Appendix A). Some of the key steps in this treatment evaluation (Fig 5 & 6) were (i) the

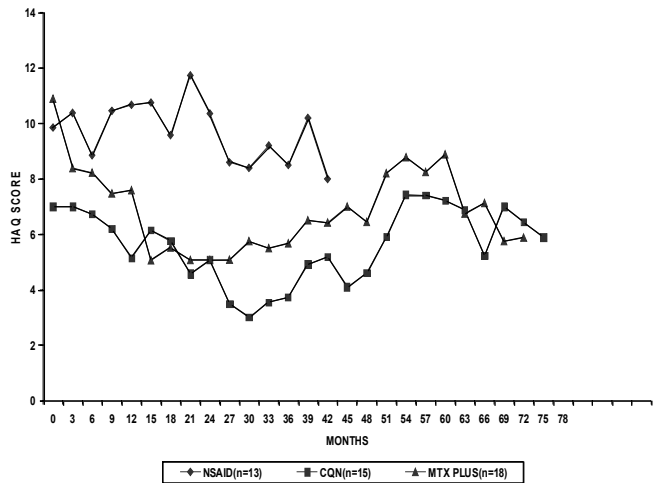


Figure 5 : Mean HAQ score over time in different treatment categories in the RA Bhigwan COPCORD RA Cohort

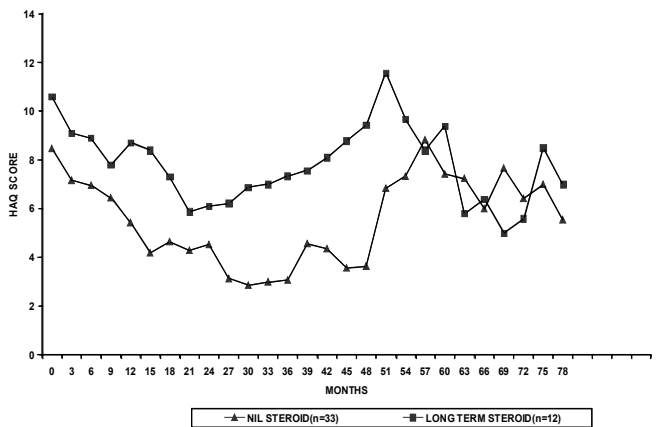


Figure 6 : Mean HAQ score over time in the Bhigwan COPCORD RA Chort in patients on long termsteroid use

entire Bhigwan RA cohort (n=51; includes old and new) was selected, (ii) patients were followed up every 3-6 weeks, (iii) HAQ was completed by trained rural health workers through interview in home/work place/ COPCORD village clinic every 6-8 weeks, (iv) patients not attending COPCORD or taking unsupervised therapy were also followed up, (v) the HAQ collection dates were converted into weeks and rearranged at 3 monthly interval bins, starting from the time of initial population survey. Sometimes the HAQ data week had to be shifted to the nearest 3 monthly bin, (vi) the higher of the 2 or more qualifying HAQ values were preferred, (vii) the nearest HAQ value was used to fill the missing value, (viii) Patients qualified as 'long term steroid user' when documented steroid exceeded 3 months per year or when the depot methylprednisolone preparation had been injected more than 3 times per year or when the period of cumulative steroid use exceeded half of the follow up period (ix) HAQ score ranges from 0 to 24. A score less than 9 is generally considered low/mild. The mean HAQ score of each of the treatment groups was computed at predetermined 3 monthly bin endpoints and plotted over time. At least data from 9 patients was required in the 3 monthly bin before computing the mean HAQ. There were 3 treatment Groups [Irregular/ unknown therapy (mostly NSAID &/or steroid use) and poor follow-up =13 patients; Chloroquine=15 patients; methotrexate=18 patients (these patients also received prior or concurrent chloroquin)]. Fig 2 shows that several patients of RA have been followed up to 7 years or so using HAQ for evaluation. Patients on long term DMARD did reasonably well with respect to HAQ derived functional ability.

We have recently observed that a low HAQ score³⁸ may fail to capture the severe functional disability arising out of a single or few joints e.g knees (in our setting). The long term COPCORD Bhigwan treat-

ment data (Fig 5) also endorses the long term safety of chloroquin. We have prescribed the cheap chloroquin sulfate to the Bhigwan patients rather than the expensive hydroxychloroquin. And except for mild-moderate skin pigment changes due to Chloroquine that were easily managed, we did not encounter any other serious clinical concerns, including ocular. It is also likely that the more severe RA patients received a combination of methotrexate and chloroquin but we have not yet analyzed the groups for their baseline measures. Fig 6 shows that only one third patients in the RA cohort were prescribed long term steroids and their HAQ scores were higher as compared to the remaining patients (not on long term steroids)

In a recent WHO-Bone and Joint Decade publication⁴⁰, COPCORD Bhigwan data was used to project prevalence statistics of RA and OA in the sub-continent. COPCORD Bhigwan has now set the stage for national statistics and a national program for rheumatic diseases.

2000 ONWARDS: New Millennium Indian Technology Leadership Initiative (NMITLI) :

CSIR, Government of India, launched a fully funded NMITLI project in 2002 to enable India to occupy a global leadership position in certain niche areas, including Ayurveda. Based on Ayurvedic knowledge and experiential base, evidence based Ayurvedic medicinal plants' derived drugs to treat arthritis, diabetes and hepatitis will be identified. The project is for a four year period. Modern medicine scientists would exercise their core competence to test and validate the various procedures, processes and applications. A parent protocol was developed for the 'arthritis component. As the group Clinical Co-ordinator, I am privileged to have premier medical institutions working along

with CRD, Pune in this very exciting and ambitious project— AIIMS (New Delhi) NIMS(Hyderabad), KEM Hospital (Mumbai) & SPARC (Mumbai). The project was begun on 01 April 2002. We have translated the Indian versions (see above) of HAQ and WOMAC into several Indian languages. Several multicentric controlled drug trials are now in progress. Our initial focus is on OA knees but we will carry out early phase II evaluation in RA as well.

Bone and Joint Decade BJD India:

The WHO supported Bone and Joint Decade⁴¹ (BJD) 2000-2010 was launched in Jan 2000. I participated in the workshops leading to the launch⁴². BJD aims to curb the growing but under recognized menace of the rheumatic-and- musculoskeletal diseases (RMSD). IRA is one of the founder members of BJD India NAN (National Action Network). I hold the office of the national secretary. The membership is steadily increasing and there is a liaison officer in several states to organize and coordinate BJD CME and public education activities. This year, BJD India has sponsored five major research programs that include a COPCORD Bhigwan model based multiregional urban population based survey for RMSD. To begin with, surveys will be completed in Jammu, Chennai and Pune. Recognizing the BJD India effort, the Dept of Science and Industrial Research (DSIR), Govt of India, has recently endorsed it with the prestigious research status of a ‘Scientific and Industrial Research Organization (SIRO)’.

Mission Arthritis India :

Mission Arthritis India (MAI) is a patient support group that operates from Pune. MAI is one of the founder members of BJD INDIA: NAN. CRD, Pune, has endorsed the programs of MAI and provides all

logistic and professional support.

CRD:

Center for Rheumatic Diseases (CRD), Pune, is now run by Arthritis Research Care Foundation, a private registered charitable society and trust. University of Pune has recognized it as a ‘research center’ for doctorate and post-doctorate studies. Based on the performance of the COPCORD Bhigwan & NMITLI programs, Govt of India has recently conferred upon CRD the status of a SIRO. This has been made possible by a dynamic and dedicated team that includes rheumatologist, research doctors, Ayurvedic physicians, microbiologist, soft ware & data-base experts, statistician and a drug trial coordinator. 3 students are doing their doctorate studies on osteoporosis, immunogenetics and Ayurvedic RA therapy. A large clinical and lab database is maintained at CRD. Several indigenously designed user friendly software programs with Visual Basic at the front end and Microsoft access at the back end have been created. Case record forms of all patients including the trial patients and COPCORD, are being entered since 1996.

I am indeed proud to be an Indian rheumatologist. Our rheumatology practices must cater for our masses. We have our own unique set of situations and problems. The very diversity that sometimes divides us is also our biggest scientific medical asset, both in terms of clinical challenge and research. Our rheumatology must be continuously made in India.

ACKNOWLEDGEMENT:

Several colleagues, friends and family have helped me transform my vision into reality. I remain indebted to each one of them. Anuradha V (in charge lab) & Manjit Saluja (co-ordinator, CRD & trials) have played a key role with exceptional responsibility and

dedication. I would not have achieved this measure of success without the personal sacrifices, generous support and deft finance management of Mehernaz Chopra. And finally, I bow to my late parents in eternal gratitude for having set me on this path.

References:

1. Chopra A. A study of polyarthritides. A dissertation submitted for MD (General Medicine) to Pune University, 1982.
2. Chopra A, Chib P. Arthritis Robustus: An unusual form of rheumatoid arthritis masquerading as gout. *J Assoc Physicians India* 1986; 34: 216-217.
3. Chopra A, Tutakne M. Syphilis and rheumatoid arthritis. *J Assoc Physicians India* 1986, 34: 272-274.
4. Jagadish TK, Kasthuri AS, Chopra A et al. Clinical profile of Connective tissue diseases in a referral service hospital. *J Assoc Physicians India* 1988; 36: 602-605.
5. Chopra A, Raghunath D, Singh A, Subramanian A R. Pattern of rheumatoid arthritis in the India Population: A Prospective study. *British J. Rheumatology*. 1988; 27: 454-456.
6. Chopra A. ARA (American Rheumatism Association) diagnostic criteria for rheumatoid arthritis: An obituary. *J Assoc Physicians India* 1987; 35: 667-668.
7. Chopra A, Raghunath D, Singh A. Chronic Inflammatory Polyarthritides in a select population of young men: A prospective study. *J Assoc Physicians India* 1989; 37: 748-751.
8. Chopra A, Raghunath D, Singh A. A spectrum of seronegative spondylarthritis (SSA) with special reference to HLA profiles. *J Assoc Physicians India* 1990; 38: 351-355.
9. Chopra A, Pispati P, Sancheti KH, et al. Medical camps in 'arthritis and rheumatism': a community oriented prospective study, with emphasis on diagnosis and education. *Bull Indian Rheumatism Assoc* 1991; 5: 31-37
10. Chopra A, Anuradha V, Neeta P, Patwardhan B, Damle AN. Community concepts and psychosocial beliefs of arthritis and rheumatism patients: basis for health education. *APLAR Bull* 1994;2:11-4.
11. Fries JF, Spitz P, Kraines RG, Holman HR. Measurement of patient's outcome in Arthritis. *Arthritis Rheum*. 1980;23: 137-45
12. Bruce B, Fries JF. The Stanford Health Assessment Questionnaire: A review of its history, issues, progress and documentation. *J Rheumatology* 2003; 30: 167-78.
13. Chopra A, Gore A, Paranjape S, Edmonds J. Modified health assessment questionnaire (HAQ): An Indian study for validity and relevance. Programme and abstracts. 8th APLAR (Asia Pacific League Against Rheumatism) Congress, Melbourne, Australia, 1996.
14. Chopra A, Lavin P, Patwardhan B, Chitre D. Randomized double blind trial of an Ayurvedic plant derived formulation for treatment of rheumatoid arthritis. *J Rheumatol* 2000; 27: 1365-72.
15. Saluja M, Chopra A. Bare Foot Applications of HAQ, and Identification of Some Risk Factors in WHO-ILAR COPCORD Bhigwan (India) Stages II and III: an Ongoing Longitudinal Population Based Study 1996 – 2004. In: Nilganuwong Surasak, editor. Proceedings of the 10th Asia Pacific League of Associations for Rheumatology Congress. Bangkok: Supjaroorn Printing Co Ltd; 2002: 335-340
16. Malaviya AN, Singh RR, Singh Y, Kapoor SK, Kumar A. Prevalence of systemic lupus erythematosus in India. *Lupus* 1993; 2:115-8
17. Chopra A, Anuradha V, Edmonds J. Detection of anti-nuclear antibodies from filter paper blood clots using indirect Immunoenzyme technique: preliminary experience and results. *J Assoc Physicians India* 2000; 5: 493-496
18. Anuradha V, Chopra A, Sturgess A, Edmonds J. Cost-Effective Screening Method for ANA Detection. *APLAR J Rheumatology* 2004;7:13-18
19. Anuradha V, Chopra A, Edmonds J. HLA- DR Typing in Rheumatoid arthritis: An analysis of 45 Hindu patients belonging to Maharashtra (Western India) (Abstract). *J Indian Rheumatism Association* 1998; 6; 70.
20. Chopra A, Poulton K, Silman A, Thomson W. HLA DRB1 associations in a community based study of inflammatory arthritis in India (abstract). *Arthritis Rheum* 2000; 43:9: S71
21. Zeggini E, Donn RP, Chopra A, Thomson W. HLA DRB1 associations and Indian Juvenile Idiopathic Arthritis – Positive Associations with HLA-DRB1*07, 10 and 12. (abstract) *Arthritis Rheum* 2000; 43:9: S324
22. Perlman AI. Things do not get better by being left alone. *The Physician and Complementary medicine*. [editorial] *J Rheumatology* 2000; 1-3.
23. Soeken K.L, Miller S.A, Ernst E. Herbal medicines for the treatment of Rheumatoid arthritis: A systematic review. *Rheumatology* 2003; 42; 652-659.
24. Chopra A, Lavin P, Patwardhan B, Chitre D. A 32 week randomized, placebo controlled, clinical evaluation of RA-11, an Ayurvedic drug, in osteoarthritis knees: Improved knee function (using Indian-Asian modified WOMAC) & pain relief. *J Clinical Rheumatol* 2004 (accepted for publication)

25. Chopra A, Patwardhan B, Lavin P, Chitre D, Polisson R. A clinical study of a herbal (Ayurvedic) formulation in RA (abstract). *Arthritis Rheum* 1996; 39 (9): S 283
26. Chopra A, Lavin P, Patwardhan B, Chitre D. A clinical study of an Ayurvedic (Asian Indian) medicine in OA knees. (abstract). *Arthritis Rheum* 1998; 41(9):S198
27. Chopra A, Doiphode V. Ayurvedic medicine. Core concept, Therapeutic Principles, and Current Relevance. *Medical Clinics of North Am*; 2002; 86: 75-89
28. Chopra A. Ayurvedic medicine and arthritis. *Rheum Dis Clinics North Am* 2000; 26: 133-144.
29. Chopra A, Patil J, Doiphode V, Patwardhan B. Exploring ancient Ayurveda for rheumatology; traditional therapy, Modern relevance and challenges *APLAR Bull* 2001; 4: 190-199
30. Chopra Arvind. Ayurvedic medicine; <http://pier.aconline.org>
31. Felson D, Anderson J, Boers M et al . The American College of Rheumatology preliminary core set of disease activity measures for rheumatoid arthritis clinical trials. *Arthritis & Rheumatism* 1993; 36: 729-740.
32. Felson DT, Anderson JJ, Boers M, et al. American College of Rheumatology preliminary definition of improvement in rheumatoid arthritis. *Arthritis Rheum* 1995; 38:727-35.
33. Chopra A, Bichile L, Rajadhyaksha A et al. Randomized Double Blind Clinical Drug Trials of Meloxicam in Rheumatoid Arthritis and Osteoarthritis Knees: An Indian Experience. *APLAR J Rheumatology* 2003 (accepted for publication)
34. Chopra A, Goregaonkar A, Maroli S, Ghai H, Vartak M, Pawar D. A randomized, double blind study to document efficacy and safety of Rofecoxib + Betacyclodextrin complex in comparison with Rofecoxib in patients suffering from Osteoarthritis. *Indian Medical Gazette*: 2002; 180-196
35. Muirden KN. The origins, evolution and future of COPCORD. *APLAR J Rheumatology* 1997; 44-48.
36. Chopra A, Patil J, Billampelly V, Relwani J, Tandale HS. The Bhigwan (India) COPCORD: methodology and first information report. *APLAR J Rheumatology* 1997; 1: 145-154
37. Chopra A, Patil J, Billampelly V, Relwani J, Tandale HS. Prevalence of Rheumatic diseases in a rural population in Western India: A WHO-ILAR COPCORD Study. *J Assoc Physicians India* 2001; 49: 240-246
38. Chopra A, Saluja M, Patil J, Tandale H. Pain and Disability, Perceptions and Beliefs of a Rural Indian Population: A WHO-ILAR COPCORD Study. *J Rheumatology* 2002; 29: 614-621
39. Malaviya AN. Rheumatology in the Asia Pacific Region: Unmet needs and challenges. *APLAR J Rheumatology* 2003;6: 68-76.
40. The Burden of Musculoskeletal conditions at the start of the new millennium. Report of a WHO Scientific group. 2003: Geneva, Switzerland. (WHO technical series; 919)
41. Hazes MJ, Woolf A. The Bone and Joint Decade 2000-2010.[editorial] *J Rheumatology* 2000; 27:1:1-3.
42. Chopra A. WHO 'Bone and Joint Decade' (BJD) launch 13-15 Jan 2000: A Report. *J Indian Rheumatism Assoc* 2000; 1: 49-51

Appendix A

Health Assessment Questionnaire (Modified – Crd Pune Version)

NAME: _____ AGE: _____ SEX: _____ DATE: _____

We are interested in learning how your illness affects your daily life. Please feel free to add any comments on the back of this page. Please check the response which best describes your abilities over the past week.

ARE YOU ABLE TO:	Without Difficulty (0)	With some Difficulty (1)	With much Difficulty (2)	Unable (3)	SCORE
I: DRESSING					
1) Dress yourself, plus doing buttons ?					_____
2) Wash your hair ?					
3) Comb your hair ?					
II: ARISING					
4) Stand up straight from a chair ?					_____
5) Get in & out of bed ?					
6) Sit cross-legged on floor & get up ?					
III: EATING					
7) Cut vegetables ?					_____
8) Lift a full cup /glass to your mouth ?					
IV: WALKING					
9) Walk outdoors on flat ground ?					_____
10) Climb up five steps ?					
V: HYGIENE					
11) Take a bath ?					_____
12) Wash & dry your body ?					
13) Get on & off the toilet ?					
VI: REACHING					
14) Reach & get down a 2 kg. object (such as bag of sugar) from just above your head ?					_____
15) Bend down to pick up clothing from the floor ?					
VII: GRIP					
16) Open a bottle previously opened ?					_____
17) Turn taps on and off ?					
18) Open door latches ?					
VIII: ACTIVITIES					
19) Work in office / house ?					_____
20) Run errands and shop ?					
21) Get in & out of a bus ?					
22) Get in & out of a car / Autorickshaw ?					
					TOTAL SCORE _____

Please check any **AIDS** or **DEVICES** that you usually use for any of these activities :

Cane Walker Crutches Wheelchair Special Built Up Chair Raised Toilet Seat

Categories for which you need **HELP FROM ANOTHER PERSON** :

Dressing & Grooming Eating Arising Walking Hygiene Reach Grip Errands

Appendix B

Womac Index (Modified - Crd Pune Version)

STUDY JOINTS: § RT KNEE § LT KNEE § BOTH

Please tick (✓) in the appropriate column

	NONE	MILD	MODERATE	SEVERE	EXTREME	SCORE
HOW MUCH PAIN DO YOU HAVE?						
1. In walking on flat surface						
2. Going up or down stairs						
3. At night while in bed						
4. Sitting or lying						
5. Standing upright						
HOW MUCH IS YOUR STIFFNESS ?						
6. After first wakening in the morning						
7. After sitting, lying or resting later in the day						
HOW MUCH DIFFICULTY DO YOU HAVE?						
8. Descending stairs						
9. Ascending stairs						
10. Standing up from a chair						
11. While standing						
12. Bending to floor (to pick up objects)						
13. Walking on flat ground						
14. Getting in and out of Autorickshaw/Bus /Car						
15. Going shopping						
16. On rising from bed						
17. While lying on bed						
18. While sitting on chair						
19. Going on/off toilet –Indian/Western						
20. Doing heavy domestic duties (moving heavy boxes, scrubbing floor, lifting shopping bags)						
21. Doing light domestic duties (cleaning room/table/cooking/dusting)						
22. While sitting cross legged on floor						
23. Rising from cross legged position						
24. While squatting on floor						

TOTAL