



Distribution of rheumatological diseases in rural and urban areas: An adapted COPCORD Stage I Phase III survey of Lucknow district in north India

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Abstract

Objectives: To study the distribution of various rheumatological diseases in rural and urban areas of Lucknow, India.

Method: A study using adapted a Community Oriented Program for the Control of Rheumatic Diseases scheme was carried out in a cluster of rural (n = 5118) and urban (n = 5053) communities through a door-to-door survey. Trained community volunteers completed the questionnaires. Patients with musculoskeletal pain (MSK pain) were clinically evaluated by a physician. X-ray examinations and blood investigations were also done. Diagnosis was made according to International Classification of Diseases-9 classification system.

Results: Among persons reporting MSK pain in rural areas, high prevalence of osteoarthritis (OA) knee (35%) was observed followed by fibromyalgia (32.1%), backache (28.4%), non-specific pain (NSP) (20.7%) and rheumatoid arthritis (RA) (1.2%). In urban area, OA knee (36.3%) and backache (36.6%) were found highly prevalent, followed by fibromyalgia (11.1%), NSP (10.9%) and neck pain (7.4%). In urban areas among MSK pain patients, prevalence of RA was only 1.6%. Age-adjusted analysis among urban people showed backache complaints begin early (>20 years) than rural people. Significantly higher numbers of Knee OA complaints emerged among urban people than rural in the age group 21-60 years. Projected population prevalence of knee OA was 44.9 and 106.07/1000 in rural and urban areas, respectively. Further projected population prevalences of fibromyalgia, backache, RA and NSP in rural and urban areas are 41.2 and 32.4, 36.5 and 106.6, 1.56 and 4.74, 26.0 and 32.0 per 1000, respectively.

Conclusion: OA knee, fibromyalgia, backache and NSP are predominant health problems of both areas. Female preponderance was observed in all rheumatological diseases in both the areas.

KEYWORDS

backache, fibromyalgia, musculoskeletal pain, osteoarthritis, rheumatoid arthritis

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1 | INTRODUCTION

Rheumatological diseases are an important cause of health-related burden and disabilities. There are more than 100 rheumatic diseases but osteoarthritis (OA), backache, fibromyalgia and rheumatoid arthritis (RA) occur in sufficient numbers to make a dent in the epidemiological profile. The World Health Organization (WHO) has labelled OA as a leading cause of disability.¹ Rheumatic diseases cause immense burden on the country in terms of loss of working efficiency of its people, their productivity and quality of life. In a country that has predominantly labor-based agriculture and labor-based industrial production, chronic disabling diseases involving the musculoskeletal (MSK) system lead not only to loss of work-days and income but also to loss of gross domestic product (GDP). Although the number of studies on this²⁻⁷ have increased in the past 10 years, no significant steps have been taken yet by policy makers. Population-based surveys conducted worldwide have also identified rheumatic diseases as an important cause of disability.⁸⁻¹² The present study is a Stage I adapted Community Oriented Program for the Control of Rheumatic Diseases (COPCORD) study. Results of phase I and phase II of this stage I study have already been reported,¹³ wherein point prevalence of MSK pain was 14.1% in rural and 28.2% in urban areas. In both the areas, knee was the most commonly affected site followed by low back and shoulder pain. Current disability of any grade was present in 69% of urban patients and 80% of rural patients. This paper provides data from stage I, phase 3 (clinical study) of this adapted COPCORD scheme conducted in rural and urban areas of Lucknow, India.

2 | METHODS

The study was carried out from 2004 to 2007, using the WHO/International League of Associations for Rheumatology (ILAR)/COPCORD model. Before starting the surveys, questionnaires were developed based on the COPCORD questionnaire (English version) used in the Bhigwan area, Pune.² The developed questionnaires were translated into Hindi (local language) and back-translated to English to test the accuracy of translation of these questionnaires. These questionnaires were field-tested on about 700 people in a rural area close to the city before the start of this study (data not presented). There were two major modifications in the COPCORD model (hence called Adapted COPCORD Scheme), namely (a) persons below 15 years of age were also included and (b) questions regarding other diseases were also added to the questionnaires (data not presented).

The following questionnaires were prepared and implemented:

1. socio-economic and demographic questionnaire
2. screening questionnaire
3. questionnaire for detailed clinical evaluation.

2.1 | Phase I

Formal training regarding details, needs of the study and how to fill the questionnaire was given to the appointed staff. Field workers were educated (post-graduate in social work), local young men and women. They were trained for this study by trained project staff. In the field they were accompanied by senior research staff as well as one physician/rheumatologist (PK). At the end of their training they were examined orally by the principal investigator (SKD) and research officers (PK and RS). In the rural area, *Gosainganj* block was selected for the study. *Gosainganj* block is approximately 35 km away from King George's Medical University, Lucknow, India. Four nearby villages, namely *Rahmatnagar*, *Barua*, *Shutur khana* and *Muhamdpur gadhi* were selected under the *Gosainganj* block. The population under the rural area had relatively poor socio-economic status. Most of the residents of the rural area were pursuing farming. In the urban area, the locality of *Rakabganj Kundari* and its adjacent localities were selected for the study, and consisted of four colonies, namely *Shastri nagar*, *Ram nagar*, *Indrani nagar* and *Kundari*. This area was selected for the study because of its mixed population of all castes and socio-economic status and its proximity to King George's Medical University. The majority of the population belonged to a middle socio-economic background. All members of a family were recruited without any age limit. Sampling method was cluster sampling and all households in the cluster were studied. The response rate was 99% during the time of demographic data collection. Census and demographic data collection were done by field workers. Help of 'Aganbadi' workers was taken in rural areas. Interview time for all family members was fixed by field workers. In case if any member was absent, his/her next most possible available time was enquired into, to fix an interview again. There was no problem in visiting again as the research team was going to the village daily for interviewing other houses.

2.2 | Phase II

Simultaneous to the demographic data collection, the whole population was also screened for rheumatic MSK pain and other general problems.

2.3 | Phase III

Three more questionnaires were then administered to the positive subjects, to collect more information about rheumatic diseases. A trained physician/rheumatologist (PK) examined all patients. If need was felt, X-rays and blood investigations were done in a nearby pathology unit in *Gosainganj* and *Kundri Rakaabganj*. Some patients were brought to K.G. Medical University for the investigations. Patients were picked up and dropped off by the field workers, and all payments (including lab tests and X-rays) were paid from the project grant. The case sheets, blood reports and X-rays were reviewed



by SKD. Response rate during this phase was 85.1% in rural and 85.3% in urban areas.

2.4 | Data and statistics

Data entry was done on Microsoft Access. All necessary calculations were done through Microsoft Excel. Population projection was done after taking into account a response rate of about 85% at the time of clinical assessment and 99% at the time of phase I/II screening.

3 | RESULTS

3.1 | Basic demographics

A house-to-house survey was executed in a total population of 10 171. Out of the total population, 5053 people belonged to urban while 5118 belonged to rural areas. Among patients with MSK pain in the rural area, high prevalence of OA knee was observed followed by fibromyalgia, backache and non-specific pain. In the rural area, maximum complaints emerged after 41 years of age.

3.2 | OA knee

In the rural area, there were 230 people diagnosed with knee OA and in the urban area there were 536 people with knee OA. Among patients with MSK pain, prevalence of knee OA was 35% (rural) and 36.5% (urban) (Table 1). Female predominance was observed in both areas, with female-to-male ratios of 151:79 and 341:201 in rural and urban areas, respectively. Sex-adjusted analysis in the rural area showed 12% of males and 23% of females suffering from OA knee. In the urban area, sex adjusted prevalence of knee OA in MSK pain patients was found to be 13.7% and 23.2% among males and females, respectively. In both the areas, knee OA was more common in females than males (Table 2). Projected population prevalence was 44.9 and 106.07 per 1000 in rural and urban populations, respectively. Knee OA was thus more common in females and in the urban area. Although prevalence of OA was similar in patients with MSK pain from both rural and urban areas, population prevalence was very different due to vast differences in the number of MSK pain patients in both areas. Age-adjusted analysis showed wide differences in knee OA complaints among rural and urban people. In the age groups of 21-60 and 61-80 years, significantly higher numbers of patients with knee OA were found in the urban area (Table 3).

TABLE 1 Comparison of different rheumatological diseases between rural and urban populations

| Diagnostic group (ICD-9) | Diagnosis | Rural prevalence among affected (N = 657) n (%) | Rural projected prevalence per 1000 among total population (N = 5118) | Urban prevalence among affected (N = 1469) n (%) | Urban projected prevalence per 1000 among total population (N = 5053) |
|--------------------------|------------------------------------|---|---|--|---|
| 715.16 | OA knee | 230 (35.0) | 44.9 | 536 (36.4) | 106.07 |
| 715.11 | OA shoulder joint | 4 (0.6) | 0.78 | 6 (0.4) | 1.18 |
| 715.15 and 719.45 | OA hip and groin pain | 29 (4.4) | 5.66 | 63 (4.2) | 12.4 |
| 721.42 and 721.0 | Lumbar spine and OA cervical spine | 14 (2.1) | 2.73 | 36 (2.4) | 7.12 |
| 729.0 | Fibromyalgia | 211 (32.1) | 41.2 | 164 (11.1) | 32.4 |
| 724.5 | Backache | 187 (28.4) | 36.5 | 539 (36.6) | 106.6 |
| 274.0 | Gouty arthritis | 0 (0.0) | | 5 (0.3) | 0.98 |
| 714.0 | Rheumatoid arthritis | 8 (1.2) | 1.56 | 24 (1.6) | 4.74 |
| 723.1 | Neck pain | 7 (1.0) | 1.36 | 110 (7.4) | 21.7 |
| | Non-specific pain | 136 (20.7) | 26.5 | 161 (10.9) | 31.8 |

N = sample size; ICD, International Classification of Diseases; OA, osteoarthritis.

TABLE 2 Comparison of prevalence by sex among rural and urban patients

| Diagnostic group (ICD-9) diagnosis | Rural patients (N = 657) | | | Urban patients (N = 1469) | | |
|------------------------------------|--------------------------|-------------|---------|---------------------------|-------------|---------|
| | Male n, % | Female n, % | P value | Male n, % | Female n, % | P value |
| 715.16 OA knee | 79, 12.0 | 151, 23.0 | <0.001 | 201, 13.7 | 341, 23.2 | <0.001 |
| 729.0 Fibromyalgia | 38, 5.8 | 173, 26.3 | <0.001 | 15, 1.0 | 109, 7.4 | <0.001 |
| 724.5 Backache | 187, 28.4 | 122, 18.6 | <0.001 | 177, 12.0 | 362, 24.6 | <0.001 |
| 714.0 Rheumatoid arthritis | 2, 0.03 | 6, 0.9 | 0.16 | 4, 0.2 | 20, 1.4 | 0.001 |

N = sample size; ICD, International Classification of Diseases; OA, osteoarthritis.

**TABLE 3** Comparison of different rheumatological diseases between rural and urban patients by age group

| Age groups | Knee osteoarthritis | | Fibromyalgia | | Backache | | Rheumatoid arthritis | | |
|------------|---------------------|-----------------|--------------|-----------------|-----------------|---------|----------------------|-----------------|---------|
| | Rural (n, N, %) | Urban (n, N, %) | P value | Rural (n, N, %) | Urban (n, N, %) | P value | Rural (n, N, %) | Urban (n, N, %) | P value |
| <20 | 1, 2550, 0.04 | 3, 1853, 0.2 | 0.1822 | 11, 2550, 0.4 | 10, 1853, 0.5 | 0.61 | 12, 2550, 0.5 | 39, 1853, 2.1 | <0.001 |
| 21-60 | 143, 2142, 6.68 | 376, 2789, 13.5 | <0.001 | 166, 2142, 7.75 | 169, 2789, 6.06 | 0.019 | 143, 2142, 6.68 | 171, 2789, 6.13 | 0.44 |
| 61-80 | 80, 264, 30.3 | 169, 387, 43.67 | <0.0006 | 34, 264, 12.88 | 20, 387, 5.17 | 0.0005 | 31, 264, 11.74 | 77, 387, 19.90 | 0.006 |
| >80 | 17, 35, 48.57 | 23, 47, 48.94 | 0.97 | 2, 35, 5.71 | 2, 47, 4.26 | 0.76 | 9, 35, 25.71 | 4, 47, 8.51 | 0.035 |

n = number of patients in particular age group, N = total number of people in particular age group.

TABLE 4 Comparison of some Indian COPCORD studies

| Sample size | Pune % | | Jammu ²⁰ % | | Bikaner ⁵ % | | Delhi ³ % | | Dibrugarh ³ % | | Jodhpur ³ % | | Agra ¹⁶ % | | Calicut ⁶ % | | Present study % | | |
|-------------------|---------------------|---------------------|-----------------------|-------|------------------------|-------|----------------------|-------|--------------------------|-------|------------------------|-------|----------------------|-------|------------------------|-------|-----------------|-------|-------|
| | Rural ²¹ | Urban ¹⁹ | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | |
| RA | 0.32 | 0.67 | 0.69 | 0.13 | 2.54 | 0.22 | 0.16 | 0.24 | 0.16 | 0.59 | 0.64 | 0.15 | 0.47 | 0.15 | 0.47 | 0.15 | 0.47 | 0.15 | 0.47 |
| Knee OA | 3.41 | 4.42 | 4.24 | 3.10 | 3.66 | 3.47 | 4.53 | 7.10 | 4.53 | 7.16 | 5.94 | 28.7 | 10.6 | 3.85 | 4.49 | 3.85 | 4.49 | 10.6 | 10.6 |
| STR/FM | 1.20 | 3.77 | 4.34 | 0.69 | 0.04 | 1.02 | 0.77 | 0.88 | 0.77 | 0.88 | 0.14 | 0.14 | 3.24 | 0.14 | 4.12 | 0.14 | 4.12 | 3.24 | 3.24 |
| Backache | 4.6 | 12.6 | 8.4 | 0.25 | 0.04 | 0.32 | 0.06 | 0.18 | 0.06 | 0.18 | 0.03 | 0.05 | 10.66 | 0.03 | 3.65 | 0.03 | 3.65 | 10.66 | 10.66 |
| Gout | 0.06 | 0.13 | 0.19 | 0.07 | 0.30 | 0.20 | 0.04 | 0.16 | 0.04 | 0.16 | 0.6 | 0.0 | 0.47 | 0.0 | 0.15 | 0.0 | 0.15 | 0.47 | 0.47 |
| Non-specific pain | 6.25 | 5.01 | 4.53 | 0.53 | 0.30 | 0.67 | 1.43 | 1.80 | 1.43 | 1.80 | 1.44 | 2.21 | 3.18 | 2.65 | 3.18 | 2.65 | 3.18 | 3.18 | 3.18 |
| SPA | 0.30 | 0.27 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

STR/FM, soft tissue rheumatism/fibromyalgia; SPA, spondyloarthritis.



3.3 | Fibromyalgia

In the rural area, 211 patients were diagnosed as having fibromyalgia out of which 173 were female and 38 were male. In the urban area, 164 patients were diagnosed as having fibromyalgia out of which 149 were female and 15 were male. The prevalence of fibromyalgia was 32.1% (rural) and 11.1% (urban) among MSK pain patients (Table 1). Projected prevalence on populations was 41.2 and 32.4 per 1000 in rural and urban areas, respectively (Table 1). It was found that prevalence of fibromyalgia increased with age in the rural area, whereas no such increase was observed in the urban area (Table 3).

3.4 | Backache

In rural area, 187 people were found to have complaints of backache and in the urban area the number was 539 people. Prevalence of backache was 28.4% (rural) and 36.6% (urban) among MSK patients. Projected population prevalence was 36.5 and 106.6 per 1000 in rural and urban areas, respectively (Table 1). Sex-adjusted analysis of backache showed significantly higher percentages of rural male patients (28.4%) than rural females (18.6%). In the urban area, a reverse trend was observed. In the 61-80 years age group, 19.9% of urban people reported backache, whereas in the rural area only 11.7% of patients had complaints of backache ($P < 0.006$) (Table 3).

3.5 | RA

In the rural area, eight patients were diagnosed as having RA, out of which six were female and two were male. The prevalence of RA was 1.2% (8/657 rural) and 1.6% (24/1469 urban) among MSK pain patients. Projected population prevalence was 1.56 and 4.94 per 1000 in rural and urban areas, respectively (Table 1). Sex-adjusted analysis showed 0.03% of males and 0.9% of females were suffering from RA. In the urban area also, significant difference was found between percentages of males (0.2%) and females (1.4%) ($P < 0.001$) with RA (Table 2). Age-adjusted analysis of the age group of 21-60 showed significant differences between patients of rural and urban areas ($P < 0.0002$) (Table 3).

3.6 | Non-specific pain

Non-specific pain was also reported by a major chunk of the MSK pain population. In the rural area 20.7% and in the urban area, 10.9% of patients reported non-specific pain. Projected population prevalence of non-specific pain in rural and urban areas was 26.0 and 32.0 per 1000, respectively (Table 1).

4 | DISCUSSION

Rheumatic diseases are having a huge impact on societies and economies due to functional decline of populations.¹⁴ Economic cost of rheumatic diseases is likely to grow since the aging of the population

increases both the prevalence and severity of impact of rheumatic diseases. Recent studies have reported that RA, OA,¹⁵ back pain and fibromyalgia⁷ are important causes of disability-adjusted life years in both the developed and developing worlds.^{8-10,16,17} India also has a broad spectrum of rheumatic MSK diseases (Table 4).¹⁸ Comparison of the few Indian studies conducted in the last 10 years (Table 4) reveals a wide range of prevalences of various rheumatic diseases. The present study is based on a modified COPCORD model in which the whole population including children were also studied. Also, the study recorded the self-reported prevalence of common complaints, for example blood pressure, diabetes, ear, nose and throat problems, stomach pain and so on (data not presented). As a result, the word Adapted COPCORD Scheme has been used in place of COPCORD model. In the present study OA knee, fibromyalgia, backache and non-specific pain were found to be highly prevalent health problems of both rural and urban areas. Jodhpur,³ Bikaner⁵ and Bhigwan¹⁰ surveys also reported almost similar findings.

In our study the prevalence of OA in the urban area of 10.6% is a little higher than that of about 7% in Dibrugarh and nearly double as compared to other centers. This was also double the prevalence in our rural area. This could have been due to an older population in the urban area compared to the rural area. Also, high step raisers were seen in most houses in the urban area. At some house step raisers were 10-12 inches. Further studies in this regard are need. Pal et al¹⁹ also found knee and hip OA as the most prevalent and leading causes of disability. Their prevalence increases with age and generally affects women more frequently than men. Females are more prone toward vitamin D and calcium deficiency than males. Females in both urban and rural areas who do housework squat to work, a risk factor for development of OA.

We observed female preponderance in all rheumatological diseases in both rural and urban areas except backache in the rural area. COPCORD studies in India have shown that backache is higher among urban than rural people. Coste and Paolaggi²⁰ reported that prevalence of backache in the general population varies between 14% and 45% and annual incidence is around 6%. In another study, 30.4% of adolescents reported low backache.²¹ Risk factors for backache are often smoking, driving and psychological stress;¹² these factors are often more common in and urban setup than rural. In our study, RA was also higher among urban than rural areas in contrast to findings by Joshi and Chopra²² and Haq et al¹⁰ In a COPCORD study conducted in Tehran, Davatchi et al¹¹ also reported high prevalence of rheumatic complaints in their population.

Fibromyalgia, a diffuse form of commonly found chronic MSK pain also accounts for disability worldwide.⁷ The present study has reported significantly high prevalence of fibromyalgia. Our findings are similar to Bhigwan and Jammu. Other centers have not reported fibromyalgia but rather soft tissues rheumatism (STR) which may overlap with non-specific pain and fibromyalgia. Our data on fibromyalgia matches more with data from the West.

Unfortunately, the methodology of our study was insensitive to diagnosing spondyloarthopathy, gout or hyperurecemia. Knee OA,



fibromyalgia and backache have been discussed because they are more common. RA has been discussed because of the preoccupation of most rheumatologists with RA.

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