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ORIGINAL ARTICLE

Prevalence of rheumatic musculoskeletal symptoms in rural and urban areas : a cross-sectional study in northern India

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Abstract

Objectives: To study the prevalence of rheumatic musculoskeletal symptoms in rural and urban areas of Lucknow.

Method: The survey was carried out in a cluster of rural (n = 5118) and urban (n = 5053) communities of Lucknow through a door-to-door survey. Demographic data were collected and subjects with musculoskeletal pain (MSK pain) were identified. A Hindi adapted version of the Community Oriented Program for the Control of Rheumatic Diseases questionnaire was used. Trained community volunteers completed the questionnaire.

Results: Present and past MSK pain was the most common self-reported problem in urban areas (34.1%), while it was the third most common self-reported problem in rural areas (15.1%), after abdominal pain and cough. Females (214.9 and 419.5 per 1000) were more affected than males (118.8 and 265.2 per 1000) in rural and urban areas, respectively. Point prevalence of MSK pain (pain in last week) was higher in urban areas (28.2%) compared to rural areas (14.1%). In rural as well as urban areas, knee (rural: 49.3%, urban: 50.6%) and spine (rural: 56%, urban: 43.6%) were highly reported pain sites. Fatigue ([n] rural: 328, urban: 368) weakness ([n] rural: 310, urban: 324) and anorexia ([n] rural: 84, urban: 142) were most common systemic symptoms reported by urban as well as rural people. Urethritis/balanitis and ulcers in the mouth were the most common other symptoms reported by people in both the areas.

Conclusion: MSK pain is a predominant health problem of both rural and urban areas. Sex-adjusted prevalence is higher among females than males. Knee and back were highly prevalent pain sites in both rural and urban areas of Lucknow.

Key words: COPCORD, musculoskeletal pain, rheumatic, sex adjusted prevalence.

INTRODUCTION

Rheumatic musculoskeletal diseases (MSK) are among the most prevalent chronic conditions in the developing world.[1] A wide spectrum of rheumatic MSK diseases is also present in India.[2–6] MSK pain appears to be the commonest cause of chronic health problems and long-term disabilities.[7,8] With an increase in life expectancy non-communicable disorders are gaining importance. The World Health Organization (WHO)/ International League of Associations for Rheumatology (ILAR) started a Community Oriented Program for the Control of Rheumatic Diseases (COPCORD) in

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developing countries in 1981. COPCORD was broadly framed to collect population data (Stage I), educate the community and identify risk factors (Stage II), and implement control and preventive strategies (Stage III). The COPCORD Stage I was designed to acquire data (primarily in developing and rural economies) on pain and disability (rather than disorders and syndromes), using a low-cost model. The study was started in 2003 when epidemiological data in India was scarce and data from only one COPCORD study were available. The initial Indian COPCORD population survey was carried out in the village of Bhigwan (Pune District, State of Maharashtra, West India) in 1996.[9–11] Since then a few studies using the COPCORD methodology have been reported covering about 58 000[2–5,9,12–15] participants with varying prevalence in urban and rural areas. India is a large country with a population of more than a billion and varying terrain and life styles. The northern state of Uttar Pradesh (UP) is the most populous state of the country and has not been covered in these surveys. The present report gives the detailed methodology, basic demographic data and final results of prevalence of rheumatic musculoskeletal symptoms seen in the Lucknow epidemiology survey (LES) completed in 2007. Besides this, this report also throws light on prevalence of other diseases, systemic symptoms, mobility status of patients, and treatment modalities optioned by patients.

METHODS

Location

Lucknow is the largest city in Uttar Pradesh.[1] It is the 11th most populous city and the 12th most populous urban agglomeration of India. Lucknow district covers an area of 2528 square kilometres (976 sq. miles). The population of Lucknow city is 2 815 601, of which 1 470 133 are men and 1 345 468 women; 66.21% of the population live in urban areas, whereas 33.79% of the population of Lucknow district live in rural areas. The terrain is mostly flat plains with temperatures ranging from 47°C (117°F) in summer to 1°C in winter (34°F).

The study was carried out from 2003 to 2007, using the WHO/ILAR/COPCORD model. A door-to-door survey was executed serially in the selected area. Thus, a population of 5118 in the rural and 5053 in the urban areas were screened. This involved 926 families in rural and 917 in urban areas, who agreed to be part of the study. The percentage of families not agreeing to join the study was small. The detailed information about the study population is provided in Figures 1 and 2.

Setting

The study was carried out in the following phases.

Phase I: A formal training regarding details, needs of the study and how to fill the questionnaire was given to the appointed staff. The localities to be studied were selected. In the rural area, a cluster of four villages in the Gosainganj block was selected for the study. Gosainganj block is approximately 35 km away from King George's Medical University, Lucknow, India. The area was selected for its typical rural trappings and because it was not too far from the city. Four nearby villages, namely Rahmatnagar, Barua, Shutur khana and Muhamadpur 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 statuses and its proximity to King George's Medical University. Rakabganj is a densely populated area with old houses, most of which were found to be damp and lacking sunshine. The majority of the population belong to a middle socio-economic background. The relationship of both areas in respect to King George Medical University is shown in Figure 3 (Google map image).

Phase II: A census of the study area was performed, under which demographic information of the study population was collected. Besides collecting demographic data, the whole population was also screened for musculoskeletal pain and other general problems. Census and demographic data collection was done by field workers. Help from 'Aganbadi' workers was taken in rural areas.

Inclusion/exclusion criteria: All residents of all ages of the study area were recruited if:

1 they reported occurrence of pain at muscles, bones, joints, or in any part of the body (MSK pain) during any stage of their life; and
2 they gave their consent to join the study.

The respondents in who MSK pain appeared, developed, or disappeared in the preceding week were considered for point prevalence.

Phase III: To collect more information about MSK pain+ persons, three more questionnaires were then administered to the positive subjects. Further, a trained

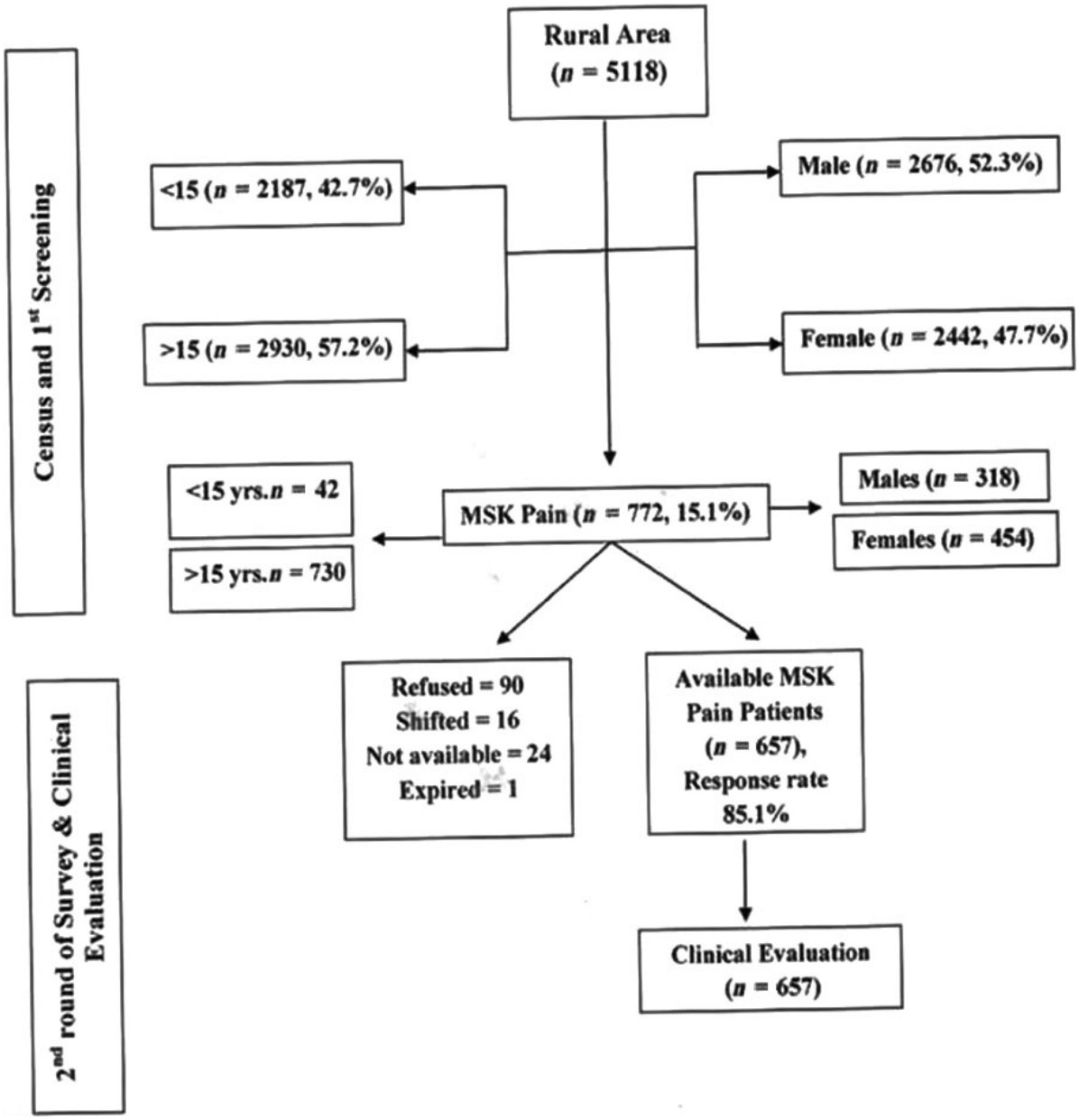

Figure 1 Summary of rural population survey.

medical doctor (PK) examined them for their MSK complaints.

Data collection

The questionnaires were developed based on the COPCORD questionnaire used in the Bhigwan area, Pune.[9,11] The questionnaires were translated to Hindi and a back-translation was done to assess internal validity. The developed questionnaires were field-tested on about 700 people in a rural area close to the city in 2000 (data not presented).

Questionnaires

The questionnaires used were patterned on the WHO/ILAR/COPCORD project. Thus, the following questionnaires were implemented.

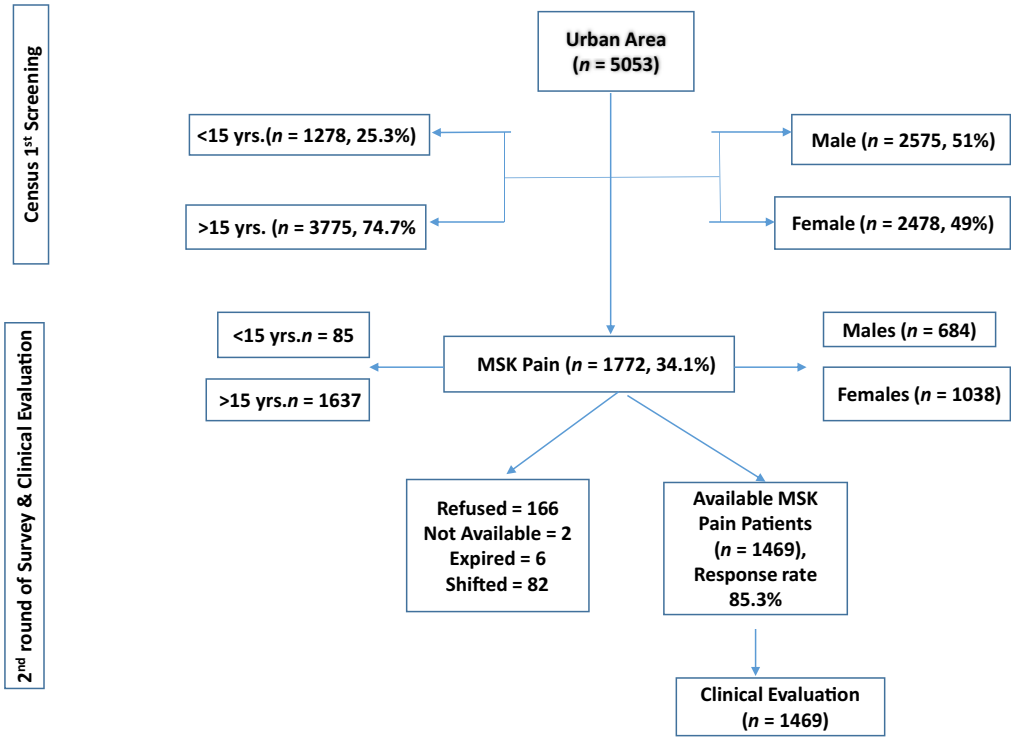

Figure 2 Summary of urban population survey

1 Socio-economic and demographic questionnaire.
2 Screening questionnaire.
3 Core questionnaire for detailed assessment of MSK pain.

Data analysis

Data were entered into Microsoft Access. The prevalence of MSK pain was estimated along with 95% confidence intervals. The prevalence for MSK diseases was also calculated by sex. The analysis was done in Microsoft Excel.

RESULTS

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 (Table 1).

Rural area

Data of total 5118 subjects from 926 families were collected. In the rural area 52.3% were male and 47.7% were female (sex ratio M : F = 1.09 : 1.00). Almost half the population (48.4%) was illiterate, whereas 57.6% of females were illiterate. The population constituted 84.7% Hindus and 15.3% Muslims; 23.2% of subjects were engaged in heavy work such as farming and labour and 21% of subjects were unemployed; 43% of subjects were under 15 years of age.

Urban area

Data of total 5053 subjects from 917 families were collected. In urban area, 51% were male and 49% were female (sex ratio M : F = 1.03 : 1.00). Almost 16% of the population was illiterate, whereas 58.4% of females were illiterate. The population constituted 92% Hindus and 8% Muslims. Only 0.3% of thepopulation was engaged in heavy work such as labour and 9% of the population was unemployed. In this study, 25.2% of subjects were under 15 years of age.

Prevalence of self-reported general health problems

In the rural area the most common self-reported problem was abdominal pain due to a recent outbreak of gastroenteritis in the village followed by cough and MSK pain. In the urban area MSK pain was the most common self-reported problem. In the rural area 772

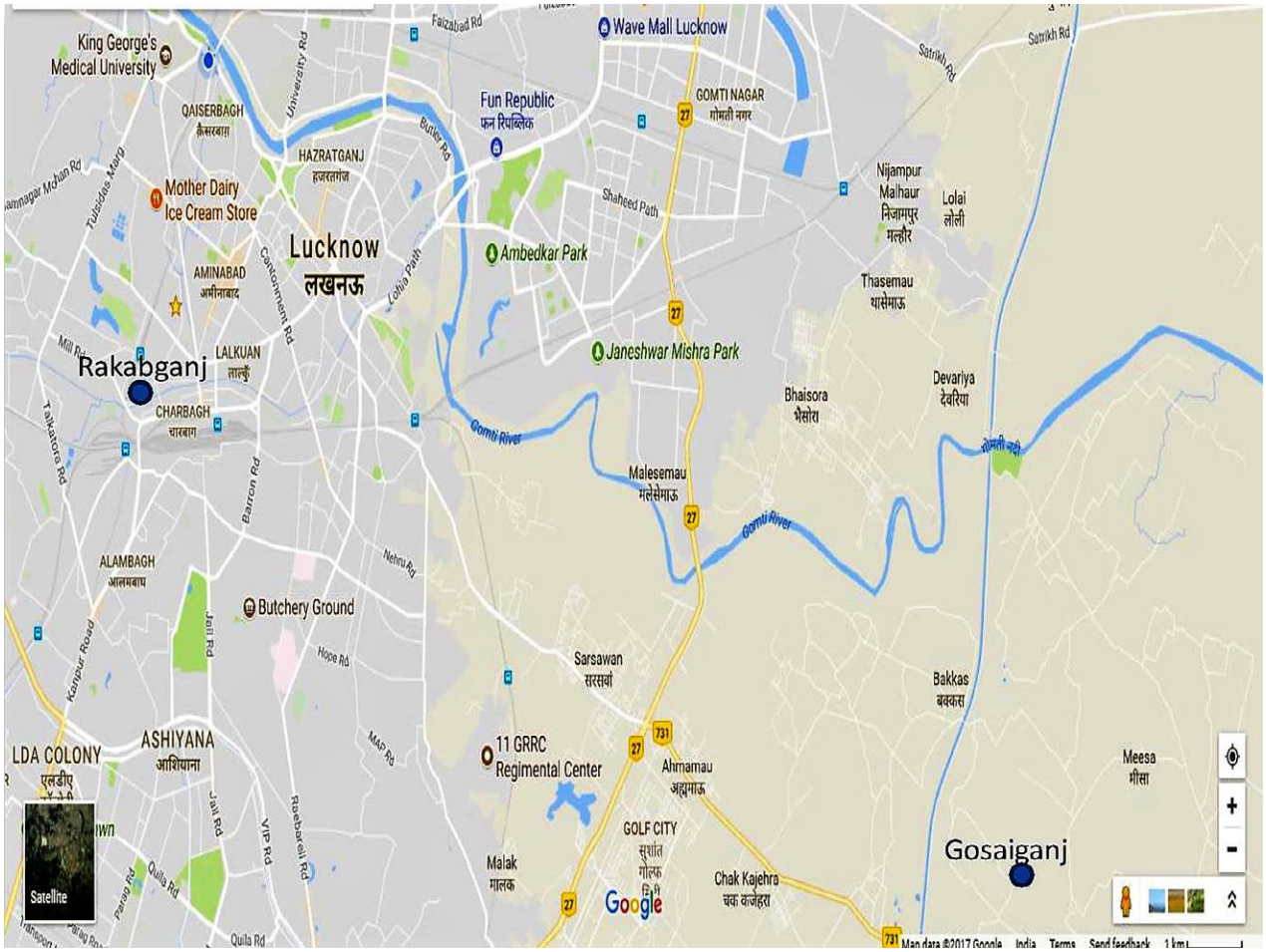

Figure 3 Google satellite image of rural and urban study area.

subjects were identified as having MSK pain, whereas in the urban area 1722 subjects were identified as having MSK pain. The overall prevalence of old and new MSK pain was 15.1% in the rural area and 34.1% in the urban area (Table 2). Out of the total positive subjects, 42 patients in rural and 85 patients in urban areas were under 15 years of age, whereas 730 patients in rural and 1637 patients in urban areas were above 15 years of age.

Point prevalence of MSK pain

Individuals complaining of pain anytime were evaluated again for detailed analysis. Out of 772 rural MSK pain+ patients, 131 people, and out of 1722 urban positive patients, 256 people were not available for further evaluation, hence data for further evaluation was 657 and 1469 patients in rural and urban areas, respectively.

Table 1 Baseline characteristics of rural and urban areas

Baseline characteristics	Rural area	Urban area
Total population	5118	5053
No. of males	2676	2575
No. of females	2442	2478
No. of families	926	917
Average family size	5.5	5.5
< 15	2187	1278
> 15	2931	3775
Illiterate	2476	807
Literate	2642	4246
Have electric supply	64	853
Do not have electric supply	538	388
Income < 3000	808	220
Income between 3000 and 6000	103	283
Income > 6000	16	414

Of these, 614 rural and 1217 urban patients complained of pain and tenderness for the last week (at the time of survey). When this was projected to the population, the point prevalence of MSK pain was 14.1% and 28.2% in rural and urban areas, respectively.

Distribution of pain

In rural as well as urban areas, the knee was the most common affected site followed by low back and shoulder pain. Besides this, shoulder, hand and ankle joint pain were also reported by many patients (Table 3). In both rural and urban areas, females had more pain in various joints than males.

Systemic symptoms and other symptoms

Fatigue ([*n*] urban: 368, rural: 28), weakness ([*n*] urban: 324, rural: 310) and anorexia ([*n*] urban: 142, rural: 84) were most common systemic symptoms reported by urban as well as rural people. Malaise ([*n*] urban: 94, rural: 21) and fever ([*n*] urban: 52, rural: 23) were also reported by patients from both the areas (Table 4). Urethritis/balanitis and ulcers in mouth/pharynx/rectum/genetilia were two most common symptoms reported by people of both the areas followed by eye pain/redness (Table 4).

Treatment-seeking behavior

Urban people (58.7%) were more likely to seek treatment than rural (49.5%) people. Of these, most urban patients opted for modern medicines (42%) for their treatment followed by homeopathy (9.8%). The rest of the people opted for other therapies for treatment of their problems. In the rural area, 36% opted for modern medicines, whereas 2.4% opted for homeopathy. The remaining patients chose other therapies (Table 5).

Disability in patients

Out of 1469 patients of the urban area, 1014 reported currently limited abilities due to MSK pain. Current disability of any grade was thus present in 69% of patients with MSK pain. In the rural area, out of 657 MSK pain+ persons, 82% reported currently limited abilities. Current disability of any grade was thus seen in 80% of patients with MSK pain (Table 6).

Results of age- and sex-adjusted analysis out of the total population

Age-adjusted analysis revealed disease progression as age advances (Table 7). Age-adjusted prevalence of rural juveniles (< 15 years) was 16.9 per 1000, whereas adult (> 15 years) prevalence for MSK pain was 211.5 per 1000. The estimated prevalence rates among urban juveniles and urban adult participants were 81.4 and 433.6 per 1000, respectively. Sex-adjusted analysis showed high prevalence in rural area for females (214.9) than their urban counterparts (118.8). Similarly, in the urban area females showed higher prevalence (419.5) than males (265.2) (Table 8).

DISCUSSION

WHO/COPCORD surveys in developing countries have shown the socioeconomic impact of MSK pain. The first COPCORD study in India, carried out in Bhigwan,

Table 2 Self-reported life-time prevalence of various diseases

Disease	Rural area (n = 5118)		Urban area (n = 5053)	
	No.	%	No.	%
MSK pain	772	15.1	1722	34.1
Diarrhoea	766	15.0	127	2.5
Pain in abdomen	1138	22.2	451	8.9
Diabetes	16	0.3	204	4.0
Eye problem	302	5.9	694	13.7
ENT problem	440	8.6	298	5.9
Cough	815	15.9	495	9.8
Hypertension	36	0.7	378	7.5
Cardiac problems	17	0.3	116	2.3
Palpitation	48	0.9	66	1.3
Dyspnea	138	2.7	234	4.6
TB	32	0.6	33	0.7

MSK, musculoskeletal; ENT, ear nose and throat; TB, tuberculosis.

Table 3 Pain at various sites in last 7 days

Joints	Rural n = 657		% of total positive	Urban n = 1469		% of total positive
	≤ 15	> 15		≤ 15	> 15	
Shoulder	4	113	17.8	3	214	14.7
Wrist	3	45	6.8	3	125	8.7
Hand	6	74	10.6	7	186	13.1
Elbow	2	65	10.2	1	132	9.0
Hip	2	67	10.5	0	77	5.2
Thigh	1	24	3.8	4	50	3.6
Knee	9	315	49.3	16	727	50.6
Leg	6	82	13.4	7	160	11.4
Ankle	3	75	11.8	4	123	8.6
Toe	1	11	1.8	1	38	2.6
Neck	2	50	12.5	1	212	14.5
Spine	5	363	56.0	5	636	43.6
Others	13	203	32.8	20	359	25.8

Pune reported MSK to be the single most predominant ailment in rural and urban communities.[5,6,10] The results of our study are similar and MSK pain was found to be the most common self-reported problem in urban areas and the third most common in rural areas. The self-reported MSK pain prevalence was much higher than self-reported prevalence of hypertension, cardiovascular diseases and diabetes in both rural and urban populations of Lucknow.

Point prevalence of MSK pain has been variable and has ranged between 7% to 14%[2–6,10–12,16] in different studies from India: Bhigwan-Pune (rural 12.9%, urban 14.1%), Delhi (rural 6.9%, urban 7.2%), Dibrugarh (rural 9.7%, urban 13.4%), Jodhpur (rural 10.6%, urban 8.6%)[3,10] (Table 7). These figures also vary internationally. Prevalences of MSK pain in rural and urban communities of Bangladesh were similar to each other.[17] However, the Indonesian COPCORD reported MSK pain in 23.6% and 31.6% of rural and urban communities, respectively.[18] A non-COPCORD survey from Taiwan reported rheumatic complains in 24.3% of rural and 26.3% of urban communities.[19] A report from the Iran COPCORD did not find any significant difference in the prevalence of various MSK symptoms between urban populations (completed in 2004–2005) and rural populations (completed in 1993).[20] Urban prevalence in our study has been high (28.2) as compared to other studies done from India. However, high prevalence of MSK pain was also obtained by studies

Table 4 Status of other symptoms

Other symptoms	Rural $n = 657$		Urban $n = 1469$	
	Past	Present	Past	Present
Eye pain/redness	2	12	29	33
Urethritis/balanitis	42	48	60	95
Skin lesion	0	1	5	8
Subcutaneous nodules	1	1	0	1
Ulcers in mouth/pharynx/ rectum/genitalia	30	10	42	46
Systemic symptoms				
Fever	3	23	33	52
Fatigue	3	328	40	368
Weight loss	1	21	7	52
Weakness	3	310	25	324
Anorexia	0	84	16	142
Malaise	0	21	17	94

Table 5 Treatment modalities optioned by people

Category	Urban $n = 1469$		Rural $n = 657$	
	No.	%	No.	%
No. of patients took treatment for MSK pain	863	58.7	325	49.5
M.B.B.S.*	452	39.0	135	20.5
Private nursing home	19	1.6	7	1.0
Primary health center	2	0.2	25	3.8
District hospital	67	5.8	45	6.8
Medical college	78	6.7	12	1.8
Super-specialized institute	3	0.3	10	1.5
Physiotherapy	20	1.7	1	0.1
Homeopathy	113	9.8	16	2.4
B.A.M.S.**	49	4.2	18	2.7
Unani	1	0.1	2	0.3
Registered Medical Practitioners	1	0.1	2	0.3
Religious	0	0.0	2	0.3
Self-remedies	26	2.3	20	3.0
Natural	2	0.2	2	0.3
Treatment taken in more than one modalities	147	12.7	135	20.5
Other	101	8.7	7	1.0

MSK, musculoskeletal. *M.B.B.S=Bachelor of Medicine bachelor of Surgery. **Bachelor of Ayurvedic Medicine and Surgery.

Table 6 Status of difficulty in performing specific tasks

$N = 1469$	Without any difficulty	With little difficulty	With much difficulty	Unable to do
Dressing	887	196	128	12
Arising from Bed	387	535	87	11
Taking full cup to mouth	955	40	12	0
Eating with hand	963	42	8	7
Brisk Walk	462	450	94	12
Bathing	777	194	28	13
Squatting for toilet	264	477	219	56
bending	383	434	168	33
Reach stretching	802	156	30	21
climbing in to auto rickshaw/ bus	399	435	166	19
siting in cross leg position	575	298	59	35
Praying	680	189	85	12
Unscrewing bottle/Jar	938	46	12	17
Relationships	869	114	8	9
Going to work	218	144	20	9
Social activity	829	134	14	19
Doing household chores	321	410	111	23

Table 7 Age-adjusted urban and rural prevalence compared with their population

Age group	Prev. rural per 100	Prev. urban per 100	Population rural $N = 5118$	Population urban $N = 5053$	Excess in urban
0–10	0.72	4.61	1578	823	−755
11–20	4.35	15.34	1133	1030	−103
21–30	8.65	25.85	876	1061	185
31–40	19.88	49.21	623	756	133
41–50	30.43	75.59	396	604	208
51–60	47.81	63.04	247	368	121
61–70	48.42	68.28	190	268	78
71–80	50	78.99	11	119	108
81–90	50	72.72	3	22	19

Table 8 Age- and sex-adjusted prevalence of both areas

Sex	Rural		Urban	
	Positive/ total population	Sex-adjusted prev.	Positive/ total population	Sex-adjusted prev.
Female	454/2442	185.9	1038/2474	419.5
Male	318/2676	118.8	684/2579	265.2
< 15 years	37/2187	16.9	104/1278	81.4
> 15 years	620/2931	211.5	1637/3775	433.6

conducted at Indonesia (31.6%),[18] Taiwan (26.3%),[19] Iran (41.9)[20] and the USA (33.2%).[21]

There could be many reasons for this high prevalence in urban areas in our study. India is experiencing a demographic shift. As per 2011 census, 31.2% of the population was living in urban areas whereas at the time of independence it was only about 20%. There has been an increasing life expectancy, particularly in urban areas. Consequently, the demographic profile has changed.

A perusal of national population figures[22] (Table 9) shows that the number of people in age groups 20 and above is much higher in urban areas than in rural areas. Similar was the situation in our study population (Table 10). In our study the prevalence of MSK pain increased with age in both urban and rural areas. A similar trend was seen in an Indian Council of Medical Research task force project on epidemiology of rheumatic pain in India.[9] However, in our study age-adjusted prevalence peaked between 40 and 50 years in urban areas and between 50 and 60 years in rural areas and then plateaued off, suggesting that MSK disease occurs earlier in urban areas. Increased prevalence of MSK pain with age and greater numbers of elderlies in urban areas may have partly accounted for increased prevalence in the urban area.

Second, the urban area chosen for the study was densely populated, having older styles of small houses with multiple stories having 8–12-inch stairs raisers that could have resulted in high prevalence of osteoarthritis if the knee and consequent knee pain. A few houses were also associated with damp conditions and lack of sunshine. Poor housing conditions are already associated with several health conditions and mental health[23,24] that could be a risk factor for fibromyalgia. Sedentary life style in urban areas could also be a major reason for high prevalence of MSK problems. Another possible reason that could lead to higher prevalence of MSK pain in urban areas could be higher literacy level leading to higher reporting of MSK pain. There are certain limitations to the study. The cause of high urban point prevalence should have been better sorted out by a multi-regression analysis. But it appears that older aged persons in urban areas, traditional older life style consisting of squatting, high step raisers in stair cases, mental stress and strain could have been responsible for this high urban prevalence. Another limitation of the study was that we did not assess the effect of climate on patterns of pain. The study continued irrespective of whether it was summer, winter or the rainy season. Also, some of the population, particularly in the urban areas, were mobile and shifted during the period of this survey and bias, if any, was not answered in this survey; however, we do not consider that it would have created a bias as we were assessing pain at any given point of time.

This study that encompassed both urban and rural areas produced interesting results. MSK pain was one of the commonest problems encountered in both the areas. Second, female prevalence was higher than that seen in males. MSK pain was twice as common in urban as compared to rural areas. MSK pain was more common in elderly as compared to children. Higher MSK pain in urban areas than in rural areas could possibly be due to population demographics with younger populations in rural areas and more

Table 9 Point prevalence of MSK disease in rural India

	Pune rural	Delhi rural	Dibrugarh rural	Jodhpur rural	Lucknow rural
Sample size	6034	5515	5033	5294	5118
MSK Prevalence	12.9	6.9	9.7	10.6	14.1
Knee pain	12.7	3.7	3.5	7.4	11.9
Back pain	20.2	0.3	0.3	0.3	11.6
	Pune urban	Delhi urban	Dibrugarh urban	Jodhpur urban	Lucknow urban
Sample size	8145	5500	4999	5742	5053
MSK Prevalence	9.2	7.2	13.4	8.5	28.2
Knee pain	8.1	3.6	6.3	6.3	29.6
Back pain	7.6	0.6	0.7	0.3	19.1

MSK, musculoskeletal.

Table 10 Rural and urban populations of India per 5000 (Census 2011)

Age group	Population rural census 2011	Per 5000 census 2011	Population urban census 2011	Per 5000 census 2011	Excess in urban
0–9	17 6,7 94, 272	1060	6 2,9 40, 632	834	−226
10–19	18 0,7 06, 966	1084	7 2,5 28, 695	961	−123
20–29	13 9,9 03, 316	839	7 2,9 34, 871	967	128
30–39	11 3,9 74, 486	683	5 9,7 61, 149	792	109
40–49	8 82, 69, 236	529	4 6,4 87, 203	616	87
50–59	5 78, 93, 302	347	3 0,3 22, 007	402	55
60–69	4 5,2 07, 515	271	1 8,9 11, 175	251	−20
70–79	2 0,1, 91, 317	121	8,2 50, 028	109	−12
80–89	1 0,8 08, 442	65	4,9 70, 365	66	1

older people in urban areas. Last, but not least, we recommend that in view of the above findings, national programs/policies should be initiated focusing on MSK diseases.

CONFLICTS OF INTEREST

None.

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