

The prevalence of musculoskeletal complaints in a rural area in Iran: a WHO-ILAR COPCORD study (stage 1, rural study) in Iran

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Abstract The objective of this study is to study the prevalence of musculoskeletal complaints and disorders in a rural area in Iran. Interviews were conducted in randomly selected subjects from five villages in Tuyserkan County, northwestern part of Iran. The three phases of stage 1 Community Oriented Program for Control of Rheumatic Diseases were done during the same day. A total of 614 houses was visited, 1,565 persons interviewed, and 1,192 persons examined. Musculoskeletal complaints during the past 7 days were detected in 66.6% (shoulder 22.7%, wrist 17.4%, hands and fingers 14.9%, hip 13.9%, knee 39.2%, ankle 19.6%, toes 12.7%, cervical spine 17.9%, and dorsolumbar spine 41.9%). Degenerative joint diseases were detected in 20.5% (cervical spondylosis 2.2%, knee osteoarthritis [OA] 19.3%, hand OA 2.7%, and hip OA 0.13). Low back pain was detected in 23.4%, soft tissue rheumatism in 2.2%, rheumatoid arthritis in 0.19%, ankylosing spondylitis in 1.1%, systemic lupus erythematosus in 0.06%, and fibromyalgia in 0.06%. The prevalence of rheumatic complaints in rural Iran is very high and needs

attention in the curricula of medical schools and in the planning of rural health care by the government.

Keywords COPCORD · Epidemiology · Musculoskeletal · Rheumatic diseases · Rheumatic disorders · Rural Iran

The International League of Associations for Rheumatology (ILAR), with the collaboration of the World Health Organization (WHO), created in 1981 the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) [1–3]. The program was aimed at the recognition, prevention, and control of rheumatic disorders in developing countries.

The COPCORD has three stages: stage 1, epidemiology or population surveys of rheumatic diseases; stage 2, education of primary health care professionals in the optimal management of common rheumatic diseases; and stage 3, improved health care and quality of life and environmental etiologic research of rheumatic diseases including genetic research in cooperation with an advanced center that might be abroad.

COPCORD stage 1 studies were performed in urban or rural areas or in both in: Australia [4, 5], Bangladesh [6], China [7–9], Indonesia [10], India [11, 12], Iran [13–16], Malaysia [17], Pakistan [18], Philippines [19–21], Thailand [22], and Egypt [23, 24].

A small COPCORD study was done in rural Iran in 1993 in the Fasham district (northern suburb of Tehran) among 2,502 persons [13]. The study was done in a rural community situated in the Elburz Mountains (altitudes of 1,840 to 2,450 m).

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A large COPCORD stage 1 study was done in an urban area (city of Tehran) from February 2004 to September 2005 [16]. In order to compare these findings with the current situation in a rural area, a new COPCORD stage 1 study was undertaken in the northwestern part of Iran by the same COPCORD team that did the urban study.

Materials and methods

The field Five villages (Mahmood-Abad, Arian, Faryazan, Karim-Abad, and Sootlagh) were selected, between 15 and 25 km of Tuyserkan, in the Tuyserkan County (State of Hamedan) in the northwestern part of Iran.

Subjects and interviews We decided to study 1,500 subjects, the minimum required for a COPCORD study. The time period for the project was set for 2 weeks. Interviews were done every day in the morning (0800 to 1300) and in the afternoon (1500 to 1930), in contrast with the urban study where interviews could be conducted only during the weekends. To interview around 150 subjects every day, a team of 19 persons was set up consisting of six interviewers, four rheumatologists for the clinical examination, two technicians for sampling blood, and support personnel.

Sampling plan In each village, the number of inhabitants, households, and persons above 15 years in each household were calculated. According to their size, the necessary number of persons to be interviewed and the number of households were calculated for each village. Households were then selected randomly from each village.

Questionnaire The COPCORD Core Questionnaire (CCQ), used in our urban study [15], was used to screen subjects for musculoskeletal complaints. The original CCQ comprised seven main sections: background information (A), work history (B), pain/tenderness/swelling/stiffness during the last week (C1) and in the past (C2), functional disability (D), difficulty in performing specific tasks (E), treatment (F), and evaluation (G). For the COPCORD study in Iran, a section was added for extra-articular symptoms of some rheumatic diseases like aphthous ulcers and blurred vision (H). The original CCQ was translated by a rheumatologist (not involved in the project) from English to Farsi and back translated to English by another rheumatologist (unaware of the original English version). The comparison of both, the original and the back translated questionnaires, did not differ significantly. In a pretest on 50 subjects, the Farsi CCQ was validated [15].

Sections A, B, C1, D, G, and H of the final questionnaire were administered to all individuals. Respondents who did not report any rheumatic complaint during the past week

(negative C1) were asked if they suffered from any rheumatic complaint before that time (C2). Part E of the CCQ was administered to those with current functional disability (positive D). For those who had current or past musculoskeletal or extra-articular complaints, part F of the questionnaire (treatment questions) was applied [16].

Training of field data collectors Interviewers were selected from the team of the Iran urban COPCORD study [16]. They were selected from Bachelor of Science certified nurses or nurse-midwives. Rheumatology subspecialty fellows did the rheumatological examination. Blood samples were taken by laboratory technicians. The data collection was supervised by the head of the team. Monitoring and quality control of the data collection in the field were done by specially trained physicians. Five workshops were organized for different personnel. The training was adjusted to the need of participants in each group and consisted of COPCORD history and its concepts, the purpose of the study, interviewing of the subjects, and the physical examination checklist. The interviewers then passed an exam by interviewing the same subjects. The observed agreement (screening with CCQ and reporting subjects as positive patient) was 0.96. The κ coefficient was 0.919 (standard error=0.112).

A pilot study was undertaken to assess the feasibility of the project. In total, 17 households were interviewed to detect possible flaws in the protocol and the design of the study and also to estimate the compliance of subjects and the percentage of subjects that will need a rheumatological examination. The data collected were given to the local health center and informative sessions were held to familiarize the local health workers with the COPCORD project.

Data collection Health workers who personally knew every person of their respective villages went to each selected house to inform the selected persons and arranged an appointment with them. The three phases of stage 1 were done on the same day, in parallel, like in the Iran urban COPCORD study. The CCQ had different parts. The first part (rheumatic problems in the past week) was administered to all. It was administered by a trained interviewer. A human mannequin figure was used to mark the pain sites by the interviewed person. Laboratory and X-rays were performed on the rheumatologist's request.

In contrast with the Iran urban COPCORD study, the team worked in the health house of the village and selected persons went there to be interviewed and have a rheumatological examination, if necessary. If a selected person did not come for the interview, a second appointment was made by the village health worker. In case of repeated absences, the interviewer went to the person's house for the interview.

The interviewers started data collection by applying the CCQ and, after completion, the questionnaire was controlled by the CCQ controller and, if necessary, a mistake was rectified. If there was a positive case that needed physical examination, he/she was introduced to the rheumatology fellow and, if indicated, blood was taken directly. If X-rays were ordered, the subject was sent by car to the nearest radiology center.

Diagnoses and definitions The CCQ, the exam sheet, and the clinical and laboratory findings of positive cases were reviewed by one of the rheumatology professors of the Rheumatology Research Center to confirm the final diagnosis. Diagnosis was made on expert opinion using the WHO-ILAR criteria [25].

Quality control and monitoring All family folder forms, CCQs, and examination sheets were checked by the team's head in the field.

Ethical issues The study proposal was approved by the national Ethics Committee on Medical Research of the Ministry of Health and Medical Education. All subjects were informed about the study goal and methods. They were enrolled after their informed consent. Participants could withdraw from the study at any stage (interview, physical exam, laboratory tests, or X-rays). A brief report on their health status and relative educational notes, laboratory results, and X-rays were sent to subjects who underwent physical examination. All laboratory tests and X-rays were free.

Data analysis Data were collected in the Access program (Microsoft). Before statistical analysis, quality control was performed by exploratory data analysis. SPSS and Stata programs were used for statistical analysis. For diseases with less than 20 cases, Poisson regression for survey data was used.

Results

Study period The study was performed from 3 to 14 September 2006.

General data Two persons refused the interview and 247 could not be reached, even by going to their houses. In total, 614 households were interviewed and 1,565 persons completed the CCQ of whom 140 persons were interviewed in their houses. The percentage of responders was 86.7%. The number of examined persons was 1,192 of whom 70 persons needed laboratory tests and 75 X-ray examinations.

In Table 1, the details for each of the five villages are shown. The male to female ratio was 0.815 to 1 with 703 males (44.9%) and 862 females (55.1%). Almost half (42.4%) belonged to the age group of 15–29 years, 16.2% to 30–39 years, 12.9% to 40–49 years, 11.8% to 50–59 years, 9.5% to 60–69 years, and 7.2% were 70 years and above. The proportion of teenagers and young adults was very high; 42.4% from 15 to 29 years compared to 28.5% over 50 years of age.

Educational levels are summarized in Table 2. The percentage of illiterate people was 25.2% and the percentage at university level was 2%.

Occupations of the participants: 65.3% were farmers, 45.8% were housekeepers, 26% were carpet weavers, 15.8% were students, 1.7% administrative employees, 12.1% other jobs, and 7% jobless. Jobs here include past and present jobs. Many had more than one job at the same time (housekeeper and farm work).

Musculoskeletal complaints during the past 7 days Musculoskeletal pain was mentioned by 1043 (66.6%) of the interviewed subjects (Table 3). The 95% confidence interval (95%CI) was 59.2–74.1%. Women complained more than men (624, 72.4%, 95%CI=63.1–81.6% versus 419, 51.6%, 95%CI=52.9–66.3%). Joint swelling was found in 340 (21.7%) of interviewed subjects, 95%CI was 16.9–26.5%. Women complained more about joint swelling than men (220, 25.5%, 95%CI=20–31% versus 120, 17.1%, 95%CI=12.4–21.8%). Joint stiffness was mentioned by 838 (53.5%) of the interviewed subjects, 95%CI was 46–61.1%. Women complained more than men (518, 60.1%, 95%CI=49.4–70.8% versus 320, 45.5%, 95%CI=38.3–52.7%). The age distribution of pain, swelling, and stiffness is shown in Table 3.

The distribution of the location of musculoskeletal complaints is summarized in Table 4. These included: shoulder 22.7%, elbow 13.3%, wrist 17.4%, hand 15%, hip 13.9%, knee 39.2%, ankle 19.6%, toes 12.7%, cervical spine 17.9%, and dorsolumbar spine 41.9%.

Diagnosed diseases Degenerative joint diseases (Table 5) were detected in 20.5% of the subjects (95%CI=17.3–23.7%): cervical spondylosis was seen in 2.2% (95%CI=0.66–3.8%), knee osteoarthritis [OA] in 19.3% (95%CI=16.2–22.5%), hand OA 2.6% (95%CI=0.28–5%), and hip OA in 0.13% (95%CI=0.01–1.3%).

Other mechanical disorders (Table 5) were chondromalacia patellae 0.65% (95%CI=0.15–2.79%), low back pain 23.4% (95%CI=17.8–28.9%), sciatica 0.06% (95%CI=0.006–0.67%), de Quervain tenosynovitis 0.13% (95%CI=0.01–1.33%), trigger finger 0.06% (95%CI=0.006–0.67%), carpal tunnel syndrome 0.65% (95%CI=0.15–2.79%), tennis elbow 0.97% (95%CI=0.01–1.93%), golfer's elbow 0.26%

Table 1 Number of subjects interviewed and physically examined in the five villages in the rural area of Tuyserkhan

Village	Households	Completed CCQ	Examined persons
Faryazan	228	525	407
Arikan	80	200	169
Mahmood-Abad	102	270	220
Karim-Abad	54	161	117
Sootlagh	150	409	279
Total	614	1,565	1,192

(95%CI=0.02–2.67), and frozen shoulder 1.04% (95%CI=0.64–1.43). Forms of periartthritis (tendonitis, tenosynovitis, and bursitis) were detected in 2.2% (95%CI=0.8–3.6%) of the population.

Inflammatory disorders (Table 5) included rheumatoid arthritis 0.19% (95%CI=0.05–0.34%), seronegative spondylarthropathies 1.10% (95%CI=0.29–4.16%), and systemic lupus erythematosus 0.06% (95%CI=0.006–0.67%).

Fibromyalgia was discovered in 0.06% (95%CI=0.003–1.23%) of the studied population.

Discussion

The figures obtained from the rural study differ from the large Iran COPCORD urban study [16]. Overall, in the rural area, more people had complaints than in the urban area. The overall rate of pain during the past 7 days was 41.5% in the urban study, while in this study, it was 66.6% (Table 3). The difference is highly significant ($p<0.001$). The odds ratio was 2.8 (95%CI=1.6–5). In the rural area, more inhabitants had swelling and stiffness during the past 7 days ($p<0.001$). Women complained more than men, as in the urban study with statistically significant differences for pain ($p<0.001$), swelling ($p<0.001$), and stiffness ($p<0.001$).

Comparing individual pain locations, again, persons in the rural area had more complaints than those in the urban

area, and the differences were statistically significant ($p<0.001$) for all sites (Table 4).

In general, OA was seen more frequently in the rural area than in the urban area ($p<0.001$; Table 5). Knee OA was seen more frequently in the rural area, but hand OA and hip OA were seen less frequently; however, the differences were not significant ($p=0.50$ and 0.07 , respectively). Cervical spondylosis was seen slightly more frequently in the rural than in the urban area but here also the difference was not significant ($p=0.65$).

In general, “periartthritis” of the shoulder was seen statistically more frequently in the rural than in the urban area ($p<0.001$; Table 5).

Among autoimmune disorders, rheumatoid arthritis was seen less frequently in the rural than in the urban area, 0.19% versus 0.33%. The difference was not statistically significant ($p=0.28$). Seronegative spondylarthropathies were on the contrary seen more frequently in the rural area, 1.1% versus 0.23%. The difference was statistically significant ($p<0.002$). There was no difference between the rural and urban area for systemic lupus erythematosus, but only a few cases were found (one case in rural versus three cases in urban area).

Fibromyalgia was seen less frequently in the rural area (0.06% versus 0.69%, $p<0.001$). The odds ratio to get fibromyalgia in the urban area was 10.9 (95%CI=1.5–78.3). No case of gout was detected in this sample of rural area, while in the urban area, the prevalence was 0.13% [16].

Table 2 Educational level of the participants, comparing the rural study and urban study

	Rural			Urban		
	Number	Percentage	95%CI	Number	Percentage	95%CI
Illiterate	395	25.2	23.1–27.4	732	7.1	6.6–7.6
Primary school (unfinished)	177	11.3	9.8–13	569	5.5	5.1–6.0
Primary school	276	17.6	15.8–19.5	874	8.5	8.0–9.1
Secondary school (unfinished)	418	26.8	24.6–29	2505	25.4	24.6–26.3
Secondary school (diploma)	147	9.4	8.1–11	3393	33.0	32.1–33.9
University	31	2	1.4–2.8	2046	19.9	19.7–20.7
Others	121	7.7	6.5–9.2	91	0.9	0.74–1.11

95%CI 95% confidence interval

Table 3 Musculoskeletal complaints during the past 7 days: age distribution (rural versus urban study)

Age	Pain (%)	Swelling (%)	Stiffness (%)
Iran rural study (Tuyserkhan)			
15 to 29	51.1	10.2	36.5
30 to 39	66.5	14.6	54.3
40 to 49	78.7	28.2	65.8
50 to 59	83.2	38.6	71.2
60 to 69	83.8	40.5	71.6
70 and over	87.5	42	77.7
All	66.6	21.7	53.5
Iran urban study (Tehran)			
15 to 29	27.9	5.3	14.5
30 to 39	43.3	11.2	27.2
40 to 49	49.6	18.3	32.3
50 to 59	56.2	23.6	38.1
60 to 69	62.4	31.6	46.1
70 and over	76.2	41.2	55.0
All	41.5	13.5	26.0

The educational level differed significantly between the rural area of Tuyserkhan and the urban area of Tehran. Those in the rural areas, aspiring to higher education, leave their villages after the secondary school. Therefore, there was a large difference in university level studies. In all universities of Iran, there are many students coming from rural areas. In rural areas, especially in small villages, people work mainly in agriculture, and they are not well mechanized. Therefore, people have harder manual work than in urban areas. Many women in rural areas assist their husbands in farm works. In this study, 65.3% of the participants worked as farmers, 45.8% as housekeepers, and 26% as carpet weavers. These percentages are cumulative, taking into account past and present work, and also more than one work at the same time (housekeeping, carpet weaving, farm working). However, more and heavier manual work and the fact that many do several kinds of work cannot explain all the differences with the urban

study. Especially the rate of pain reported, especially neck pain, low back pain, and knee pain, were the highest ever seen in Asia Pacific League of Associations for Rheumatology (APLAR) countries. (Table 6) The differences cannot be explained by the incomprehensiveness of the language or different meanings of the same words. The inhabitants in all these villages are Caucasians and their native language is Farsi, the official language of Iran. It may be that perceptions and beliefs of the local people play a role [11]. Further rural studies in Iran will have to confirm these results.

In Table 6, the findings of the rural COPCORD studies in the APLAR region (Asia and Pacific Area) are summarized [26]. Knee OA has a high prevalence in Iran as in most Asian countries in contrast with hip OA [26]. Soft tissue rheumatism was seen in 2.2% in the rural area in Iran. It was near those reported from the rural areas of Pakistan (1.9%) and Bangladesh (2.7%). Rheumatoid arthritis with 0.19% is much lower than in the Western

Table 4 Musculoskeletal complaints during the past 7 days: joint distribution (rural versus urban study)

	Rural		Urban		Comparison <i>p</i> value
	Percentage	95%CI	Percentage	95%CI	
Shoulder	22.7	19–26.4	14.5	13.5–15.6	<0.001
Elbow	13.3	9.2–17.4	6.7	6.2–7.2	<0.001
Wrist	17.4	12.6–22.2	10.0	9.3–10.7	<0.001
Hand	15	10.5–19.5	9.4	8.5–10.3	<0.001
Hip	13.9	10.7–17.1	7.1	6.4–7.7	<0.001
Knee	39.2	34.9–43.5	25.5	23.9–27.1	<0.001
Ankle	19.6	15.5–23.6	9.8	9.1–10.5	<0.001
Toes	12.7	10.7–14.6	6.1	5.5–6.8	<0.001
Cervical	17.9	13.8–22	13.4	12.4–14.4	<0.001
Dorsolumbar	41.9	36.8–47	21.7	20.2–23.2	<0.001

95%CI 95% confidence interval

Table 5 Disease distribution (rural versus urban study)

	Rural			Urban		
	Number	Percentage	95%CI	Number	Percentage	95%CI
All OA	321	20.5	17.3–23.7	1,651	16.6	15.3–17.8
Knee OA	303	19.3	16.2–22.5	1,532	15.3	14.1–16.4
Hand OA	41	2.7	0.3–5.0	309	2.9	2.3–3.4
Hip OA	2	0.13	0.01–1.33	29	0.32	0.21–0.44
Neck OA	34	2.2	0.7–3.8	185	1.7	1.4–2.1
Chondromalacia patellae	10	0.65	0.15–2.79	301	3.7	3.1–4.3
Low back pain	366	23.4	17.8–28.9	1,440	15.4	14.4–16.5
Sciatica	1	0.06	0.006–0.67	79	0.86	0.63–1.10
De Quervain tenosynovitis	2	0.13	0.01–1.33	22	0.23	0.15–0.32
Trigger finger	1	0.06	0.006–0.67	21	0.21	0.13–0.32
Carpal tunnel syndrome	10	0.65	0.15–2.79	155	1.27	1.0–1.5
Tennis elbow	15	0.97	0.01–1.93	121	1.21	0.9–1.5
Golf elbow	4	0.26	0.02–2.67	50	0.51	0.35–0.71
Shoulder rotator cuff	–	–	–	241	2.5	2.1–3.0
Frozen shoulder	16	1.04	0.6–1.4	54	0.54	0.39–0.72
All periarthritis of shoulder	34	2.2	0.8–3.6	448	4.6	3.9–5.4
Rheumatoid arthritis	3	0.19	0.05–0.34	35	0.33	0.22–0.46
Seronegative spondylarthropathies	17	1.10	0.3–4.2	18	0.23	0.16–0.35
Systemic lupus erythematosus	1	0.06	0.006–0.67	3	0.04	0–0.11

95%CI 95% confidence interval

world [27–30] but comparable with figures from rural areas of Thailand (0.12%), Philippines (0.20%), Malaysia (0.15%), and Indonesia (0.20%). Although gout was reported from many rural areas of the APLAR region, it was not detected in interviewed subjects of this study, while it was detected in the 1993 rural study of Fasham region in Iran [13].

In the north of China, the percentage of people having knee pain and low back pain is much higher than in the south [7, 9]. There was a decrease in the prevalence of knee and back pain with latitude, suggesting an association with climate. Knee and back pain and radiological degenerative changes in the knee and lumbar spine were twice as

Table 6 COPCORD studies in rural areas of the Asian countries and Australia

	No.	Pain	LBP	Neck pain	Knee pain	OA	STR	FM	RA	SPA	CTD	Gout
Australia aboriginal [5]	847	33	12.5		11.2	5.5	7.4		0	0.5	0	4
Bangladesh rural [6]	2,635	26.9	6.6	10.8	14.0	7.5	2.7	4.4	0.7	0.01	0	0
China—north [7]	4,192		35	5	30				0.34	0.26	0.01	
China—Shantou [7]	5,057		13.1	2	2.6				0.32	0.26	0.02	
Indonesia rural [10]	4,683		15.1	4.8					0.2			0.81
India [12]	4,092	18.2	11.4	6	13.2	5.8	5.5		0.5			0.12
Iran rural 1993 [13]	2,502	48.1	18.5	6.4	17.9	16.1	6.4	1.3	0.32	0.08		0.28
Iran rural 2006	1,565	66.6	41.9	17.9	39.2	20.5	2.2	0.06	0.19	1.10	0.06	–
Malaysia [17]	2,594	21.1	11.6	6.1	9.2			0.01	0.15	0.12	0	0
Pakistan [18]	2,090	14.8	1.9			3.7	1.9	2.1	0.55	0.10	0.05	0.14
Philippines rural [19]	846	14.5	11.3	7.3	7				0.2			0.6
Thailand [22]	2,463	17.6	4	3.4	5.7	11.3	1.5		0.12	0.12	0.08	0.16
Egypt [23]	5,120	16.7	5.1	2.2	9.3	8.5	6.6	1.3	0.29	0.15	0.05	

No. population interviewed, LBP low back pain, OA osteoarthritis, STR soft tissue rheumatism, FM fibromyalgia, RA rheumatoid arthritis, SPA seronegative spondylarthropathies, CTD connective tissue diseases

prevalent in apartment residents as in those living in older single-level houses [9, 34]

This study has some weak points and limitations. In the CCQ, some questions asking the interviewed individual to recall complaints in the past may not be precise enough. As an example, data on musculoskeletal pain, especially their duration, may vary if the person is interviewed a second time.

Strong points are the response rate of 86.7% in the rural area, which was better than the 75% in the urban study. This study was done with the same team which performed the urban study and using the same CCQ, thus eliminating some of possible biases when studies are done with different teams and using different questionnaires.

Conclusions

The prevalence of rheumatic complaints in rural Iran is very high and needs attention in the curricula at medical schools and in the planning of rural health care by the government [31–33].

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